ORDER

6530.9A

VERY HIGH FREQUENCY DIRECTION FINDER PROJECT IMPLEMENTATION PLAN

August 31, 1993

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Distribution: A-W(NN/SU/HT/TR/FS/OS)-3; A-Y-2; A-Z-1; A-X(AF/AT/FS)-3; A-FAF-0(Ltd)

Initiated By: ANN-600

RECORD OF CHANGES

DIRECTIVE NO. 6530.9A

CHANGE TO BASIC	SUPPLEMENT			OPTIONAL	CHANGE TO BASIC	SUPPLEMENTS			OPTIONAL

FOREWORD

This order provides technical guidance and management direction for the orderly implementation and acceptance of the Very High Frequency (VHF) Direction Finder (DF) replacement equipment into the National Airspace System (NAS). This is a Capital Investment Plan (CIP) 24-11 infrastructure replenishment project, that provides for the replacement of selected obsolete FA-5530 tube type DF facilities. This order identifies and describes specific requirements, events, tasks, and activities to be accomplished, as well as project implementation procedures, organizational, and program management. Management responsibility for this program is assigned to the Program Manager for Navigation, ANN-300, with acquisition activities directed by the Associate Program Manager for Engineering, ANN-600.

The goal of this order is to provide a uniform approach for all organizations that have a role in conducting activities necessary to implement any portion of this project. The procedures and responsibilities in this order were developed using current agency directives. The format and content is organized and presented per FAA-STD-036a, Preparation of Project Implementation Plans, and Order 1320.1D, FAA Directives System.

Charles B. Ochoa
Program Manager for Navigation

TABLE OF CONTENTS

CHAPTER 1. GENERAL

1. PURPOSE. This order provides the Project Implementation Plan (PIP) for the VHF DF System under CIP 24-11. The intent of the PIP is to provide technical guidance overview, a brief description of the activities required to ensure successful project implementation, and to describe specific responsibilities for various tasks. It is not the intent of the PIP to provide detailed abstracts of all applicable agency directives that establish policy and procedures. It is assumed that the participating organizations routinely operate in accordance with current orders and directives. Thus, directives referenced will be placed in perspective as they apply to the current VHF DF replacement program. The support and cooperation by all involved organizations is essential for successful implementation of the DF replacement program.

2. DISTRIBUTION. This order is being distributed to branch level in the offices of the Program Director for Navigation and Landing, Training and Higher Education, Air Traffic Plans and Requirements, Flight Standards, Operational Support Services, and Associate Administrator for Contracting and Quality Assurance; to division level at the Mike Monroney Aeronautical Center; to director level at the Federal Aviation Administration Technical Center; to branch level at the regional Airway Facilities, Air Traffic, and Flight Standards divisions; and limited distribution to all Airway Facilities field offices.

3. CANCELLATION. Order 6530.9, Very High Frequency Direction Finder (VDF), System Program Plan (SPP) and System Implementation Plan (SIP), dated January 12, 1988.

4. DEFINITIONS. The following acronyms and abbreviations are used in this order:

AC	alternating current
AF	Airway Facilities (Region/Sector)
AFSS	Automated Flight Service Station
AMC	Mike Monroney Aeronautical Center
APME	Associate Program Manager for Engineering
APML	Associate Program Manager for Logistics
APMT	Associate Program Manager for Testing
ASU	Office of the Associate Administrator for Contracting and Quality Assurance
BCPS	Battery Charger Power Supply
bit	Binary Digit
BITE	Built-in Test Equipment

bps	Bits per second
CCB	Configuration Control Board
CIP	Capitial Investment Plan
CM	Configuration Management
CO	Contracting Officer
COTR	Contracting Officer Technical Representative
DF	Direction Finder
DOT	Department of Transportation
DRR	Deployment Readiness Review
DT&E	Development Test and Evaluation
ECP	Engineering Change Proposal
FAA	Federal Aviation Administration
FRDF	Facility Reference Data File
FSS	Flight Service Station
GFE	Government Furnished Equipment
GBL	Government Bill of Lading
GFM	Government Furnished Materials
Hz	Hertz
ILSP	Integrated Logistics Support Plan
IDCU	Information Display and Control Unit
IOT	Input/Output Terminal
ISSAC	Initial Site Support Allowance Charts
JAB	Joint Acceptance Board
JAI	Joint Acceptance Inspection
kHz	kilo-Hertz
LRU	Line Replaceable Unit
MDT	Maintenance Data Terminal
mHz	mega-Hertz
MPS	Maintenance Processor Subsystem
NAS	National Airspace System
NAILS	NAS Integrated Logistics Support
NAILSMT	NAS Integrated Logistics Support Management Team
NAVAIDS	navigational aid
NCP	NAS Change Proposal
NDB	Non-Directional Beacon
NOTAM	Notice to Airman
OJT	On-the-Job Training
ORD	Operational Readiness Demonstration
OT&E	Operational Test and Evaluation
PAT&E	Production Acceptance Test and Evaluation
PC	Personal Computer
PM	Program Manager
PIP	Project Implementation Plan
PSRB	Program Status Review Board
QRO	Quality Reliability Officer

RF	Radiofrequency
RFI	Radio-Frequency Interference
RMM	Remote Maintenance Monitoring
RMMC	Remote Maintenance Monitoring and Control
RMMS	Remote Maintenance Monitoring System
RMS	Remote Monitoring Subsystem
RMSC	Remote Monitoring Subsystem Concentrator
SIP	System Implementation Plan
SPP	System Program Plan
ST&E	Shakedown Test and Evaluation
TLP	Transmission Level Point
TO	Technical Officer
TSARC	Transportation Systems Acquisition Review Committee
TSSC	Technical Support Services Contractor
vac	Volts, Alternating Current
vdc	Volts, Direct Current
VDF	Very High Frequency Direction Finder
VHF	Very High Frequency
VOR	Very High Frequency Omnidirectional Range
VORTAC	Very High Frequency Omnidirectional Range with Tactical Air Navigation Equipment

5. AUTHORITY TO CHANGE THIS ORDER. The Program Manager for Navigation may issue changes to this order necessary to manage and implement the project which do not affect policy, delegate authority, or assign responsibility.

6. UPDATE AND REVISION COMMITMENT. PIP updates and revisions will be accomplished in accordance with Order 1320.1D, Chapter 7, paragraph 701. This order will be updated based upon project-unique circumstances or requirements changes which result in significant changes in the project schedule milestones or a revalidation at a minimum of every two years.

7.-19. RESERVED.

CHAPTER 2. PROJECT OVERVIEW

20. SYNOPSIS. The VHF DF acquisition project fits into the CIP as follows:

TABLE 2-1. VHF DF PROJECT INTERFACE

System	National Airspace System
Element	Ground-to-Air Element
Subelement	Automated Flight Service Station
Subsystem	VHF DF
Program	VHF DF Replacement Equipment

The following equipment, services, and support are included in this procurement:

a. VHF DF Antenna receiver facility and the Automated Flight Service Station (AFSS) equipment. Information Display and Control Unit (IDCU) and Remote Maintenance Monitor and Control (RMMC) equipment in accordance with FAA specification (Purchase Description) PD-420-02, Revision 4.

b. Provisioning Technical Documentation.

c. Onsite spares.

d. Spare parts-peculiar.

e. Installation kits.

f. Contractor Maintenance Training for FAA technical personnel.

g. Users Guide for Flight Service Specialist DF operators.

h. Engineering support services.

i. Contractor repair services.

21. PURPOSE. The goal of this project is to purchase and install "state-of-the-art" automated VHF DF Systems for the replacement of existing FA-5530 tube type DF facilities to support the NAS throughout the 1990's.

22. HISTORY. Installation of solid state FA-9964 DF equipment began in 1981 and was completed in 1985. To complete replacement of the tube-type equipment and to establish sites for improved DF coverage, the current VHF DF project contract was awarded in 1984. The VHF DF project, encompassing three phases through 1995, provided for the selection of a DF antenna with improved accuracy and less susceptible to lightning damage; and a design to provide the capability for integrated control, remote maintenance monitor (RMM), and certification of multiple DF receivers from an AFSS. These activities bring the project to the portion of Phase II where testing and demonstration of the first pre-production units, and Critical Design Review were concluded.

There are currently 272 facilities equipped with FA-5530 and FA-9964 VHF DF equipment. This contract provides for delivery of 115 antenna receiver site systems consisting of antenna assembly with preamplifier, target transmitter/antennas, receiver/bearing processor, monitor/control equipment, and battery charger power supply unit. The new antenna receiver site systems will be used to replace 112 of the FA-5530 and older facilities. For antenna receiver sites that may experience radio-frequency interference (RFI), 20 preamplifier/filter units were purchased and will be deployed to those problem facilities. There will also be 64 AFSS facility systems acquired under this contract, consisting of two IDCU's, RMMC equipment, and work station input/output terminal (IOT) equipment with 61 being deployed at AFSS facilities. The remaining three systems will be installed at the FAA Academy for training, the FAA Logistics Center for depot level maintenance functions, and the National Airway Systems Engineering Division, AOS-200, for field support.

23. SCOPE. The VHF DF network is maintained and operated by the FAA as a position location service for pilots. The project to upgrade the network by replacing existing tube-type equipment with solid state equipment is being executed in three phases. Phase I involved system design and definition. Phase II consisted of design, limited production of three pre-production systems, and testing. Phase III, the current program, involves production, training, and limited engineering support for the installation and maintenance of the DF equipment. With full implementation, the project spans the years 1984 through 1995.

24. SYSTEM CONCEPT. An expanded DF network operated from AFSS sites is necessary to provide rapid and accurate position orientation for pilots of aircraft who are uncertain of their position or are in distress, to locate downed aircraft, and to provide position reference information to pilots upon request. The present network is made up of a mix of tube-type and solid state equipments. The tube-type equipment must be replaced in order to reduce power consumption and maintenance requirements by incorporating RMM, control, and certification capabilities. The integration of graphic display terminals will enhance the specialist's ability to locate aircraft in a timely manner by significantly reducing (if not eliminating) the need to manually plot the aircraft position and reference information. The purpose of this project is to provide a homogenous network of solid state DF equipment with RMM and graphics display terminals.

25.-29. RESERVED.

CHAPTER 3. PROJECT DESCRIPTION

30. FUNCTIONAL DESCRIPTION.

a. A VHF DF system is designed to operate over a frequency range of 118.000 to 136.975 mega-Hertz (mHz). The DF receiver will provide 760 channels spaced every 25 kilo-Hertz (kHz) with 10 preset channels. The DF system will be capable of receiving an aircraft transmission on one or more DF's and presenting to the operator, in graphical form, position information of the aircraft relative to other points of interest. Information from Very High Frequency Omni-directional Range (VOR), Non-directional Beacons (NDB), and pilot reports can be input to the system to aid in determining a position. The system provides intelligible audio from the aircraft to the operator and has the capability for RMM and control. The system functional diagram is depicted in Figure 3-1, VHF DF System Overall Function Diagram.

b. The operator has available two types of data:

(1) Position data which represents the items of interest that are located at a specific latitude and longitude in the geographical area under control. Some examples are the DF facilities, airports, navigational aids (NAVAID), and aircraft. Position data will shift on the display when the display range or center is changed. The system has the ability to display tags of alphanumeric data attached to the position symbols.

(2) Text data represents the information available from the computer and input messages. Text data position does not change when the range or center is changed. The operator has control over which of the two types of data is on the display.

c. The system may include up to a maximum of 24 DF receivers connected to a maximum of four operating positions. Each position operates independently of the others. The area of interest for the AFSS DF display is the geographical service area of the AFSS plus an additional 50 nautical miles beyond the AFSS boundary.

d. The full data base described by the area of interest is available to all operating positions. Each operator can select from the data base on a non-interfering basis. Also, each operator has the ability to define his/her center of interest and range of interest through the use of a trackball or keyboard entry. The positional data that falls in that area will be automatically selected and displayed on that operating display.

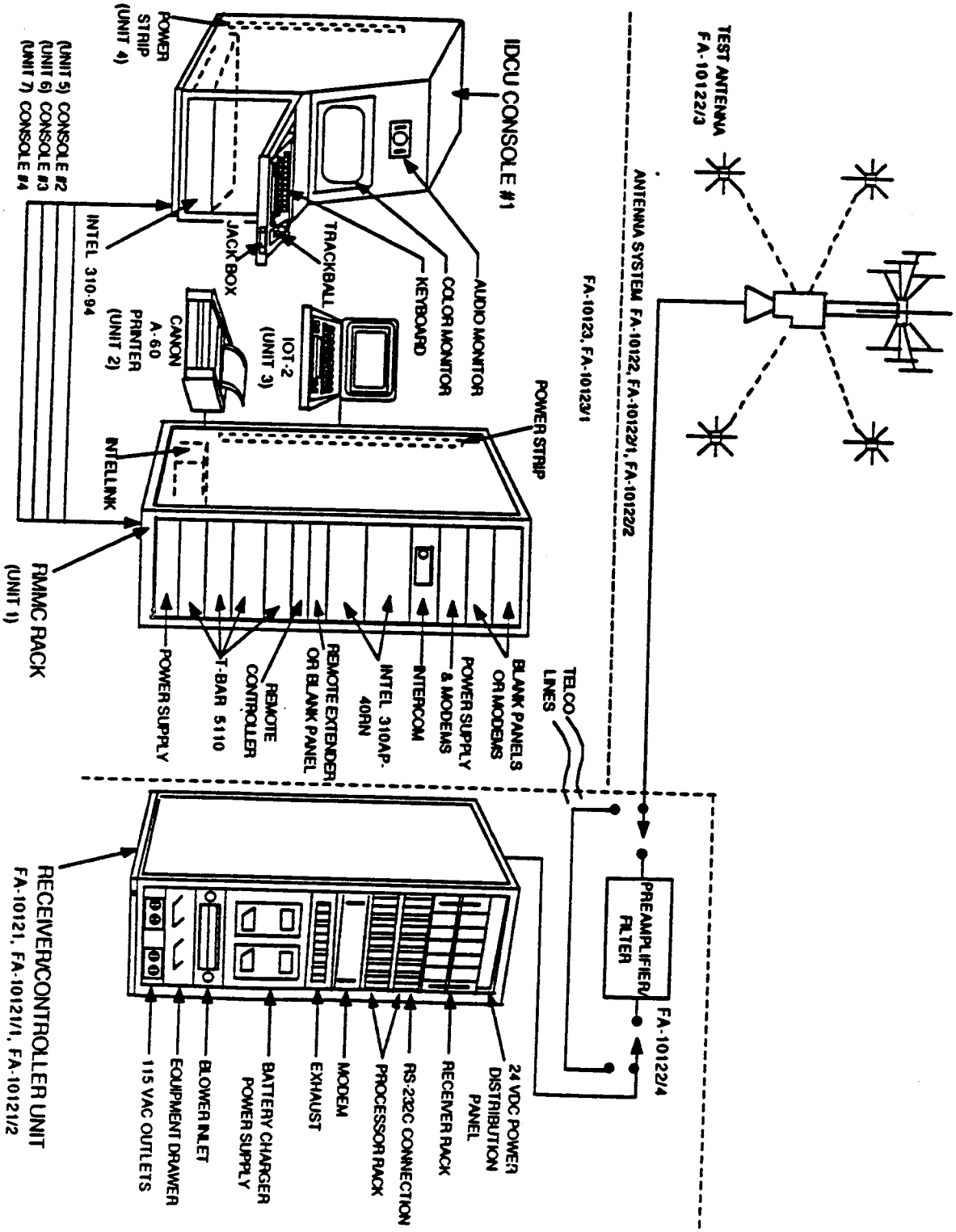


FIGURE 3-1. VHF DF SYSTEM OVERALL FUNCTIONAL DIAGRAM

e. When triangulation is possible from two or more VHF DF's, NDB bearings, or VOR radials, the aircraft location is automatically displayed on the operators display. Additionally, when the system is placed in the emergency mode, the heading and distance to the nearest airports (limited to six) will be displayed. When triangulation is not possible, a straight line is displayed on the operators display from any DF receiving a signal. The direction of the line will represent the azimuth received by the DF receivers.

31. PHYSICAL DESCRIPTION. The VHF DF system consists of six major elements: the antenna assembly with preamplifier and target transmitter/antennas, the receiver and bearing processor unit, the preamplifier/filter, the battery charger power supply (BCPS), two IDCU's, and the RMMC unit. The preamplifier/filter units will only be deployed to those sites experiencing RFI problems. The antenna assembly bolts through its mounting flange to a Government Furnished Equipment (GFE) pedestal. The receiver and bearing processor unit convert the received signal into digital bearing data and sends this along with pilot audio to the RMMC at the AFSS. Frequency selection and other operator functions may be performed locally at the antenna site through the receiver and bearing processor unit, or remotely at the IDCU. To facilitate maintenance, the remote maintenance monitoring system (RMMS) processor located at the AFSS site, will provide for local or remote maintenance monitoring, control, equipment certification, and interface to the maintenance processor subsystem (MPS). Operation and control from the AFSS to the receiver site will be over FAA supplied dedicated communication lines that also provide an audio communications path.

a. Antenna Assembly. The FAA-10121 DF antenna design is a 10 element Adcock array. It contains no commutation electronics in the hub for sensing bearing. The dipole housing and array element assembly is designed to be mounted to a 9.4 foot tubular mast with a flange for bolting on a concrete pad. A tower will be used to raise the antenna if close-in obstructions threaten to degrade the line-of-site VHF reception from the ground. A dual obstruction light fixture (equipment specification FAA-L-810, Obstruction Light) or equivalent will be provided. The entire antenna assembly is approximately 16.5 feet tall, 7.3 feet in diameter at the elements, and weighs about 860 pounds.

(1) Dipole Elements. These elements will be removable and interchangeable. The electrical connection is ensured through cabling that is separate from the mechanical installation of the element. RF cabling is integral to the antenna assembly and terminates at a weather-proof electronics enclosure mounted at the base.

(2) Antenna Electronics. The antenna electronics are mounted at the base of the antenna in a waterproof enclosure. These electronics combine the signals from the 10 outer array elements into five composite directional signals and a sense signal. The signals are combined to reject strong out-of-band signals, and to provide good sensitivity in the presence of strong signals.

(3) Cabling. The requirements for cabling consist of the obstruction light circuit; 24 Volts direct current (vdc) circuit; control, signal, and built-in test equipment (BITE) from the Bearing Processor Unit; and the radio frequency (RF) output cable from the antenna electronics. Weather-proof mating connectors are provided by the contractor. The FAA will provide site cabling for all intra-rack wiring of units. The antenna assembly will not be located more than 2,000 feet from the bearing processor unit.

b. Target Transmitter Assembly. The target transmitter assembly is self-contained with a built-in test function which permits selective emission of a DF test signal from four separate target antennas. These transmitters supply known bearing information for verification of bearing accuracy, sensitivity, and system functionality tests. The assembly consist of a pedestal-mounted VHF transmitter and switching assembly located at the base of the DF antenna and four separate directional target antennas located at approximately 90 degree increments on about 150 foot radii from the DF antenna. Directional elements are used to minimize interference to other equipment and to minimize reflective paths to the DF antenna array.

c. Receiver and Controller/Processor Subsystems. This processor unit consist of the VHF receiver, the bearing processor, and a two-way voice intercom. It will be located in a shelter at the antenna site, not greater than 2,000 feet away. This unit will also interface to the RMMC unit for remoting test signals and monitoring system parameters.

(1) Receiver. The DF receiver is a superheterodyne type, providing coverage from 118.000 to 136.975 mHz. Frequency selection will be by means of a frequency synthesizer permitting operation on 760 channels at a 25 kHz spacing. Preset frequencies may be selected from 10 programmable function keys. Only one frequency will be selectable at a time. The receiver will also provide audio through a headset or speaker at the IDCU operator's position and bearing data for the information display.

(2) Bearing Processor. The bearing processor will convert the received signal to bearing information in digital form for transmittal to the AFSS. It will sense periods of multiple signal detection and continue audio output but inhibit bearing information at the operator's position. When no useable bearing is available, the numeric bearing will display three dashes.

(3) Frequency Synthesizer. This unit allows for operation of the system on 760 channels starting at 118.000 mHz in 25 kHz intervals through 136.975 mHz. Interlock circuitry inhibits operation of the receiver unless the synthesizer circuits are synchronized on the selected frequency.

(4) Four-Wire Circuit Interface. The four-wire unconditioned 3 kHz voice grade zero/zero Transmission Level Point (TLP) circuit provides both voice and data/control interchange between the processor unit and the control unit. The received audio signal will always be transmitted to the control unit unless the receiver is squelched and the audio is muted.

(5) Voice Intercom. An intercom unit on the processor unit provides for two-way voice communication between the DF site and flight service station. Pilot audio has precedence over the intercom use. The intercom is not required for maintenance operations, but is provided as a convenience.

d. Preamplifier/filter. The preamplifier/filter assembly is a self contained narrow bandpass preselector filter with a microprocessor controlled RF preamplifier. The preamplifier filter is an optional piece of equipment to be installed only at sites determined to need interfering RF noise filtered out at the antenna site. The enclosure assembly is a unitized aluminum box with a hinged door and a connector entrance area. It is designed to be completely weather and pressure sealed. Standard installation will be collocated with the Receiver and Controller/Processor Subsystem, no further than 2,000 feet from the antenna. A fail-safe bypass is connected to the preamplifier filter that may be operated automatically or manually upon determination of a failure. Bypassing the unit will allow the DF to continue operation until the preamplifier filter failure can be corrected.

e. Information Display and Control Unit. The IDCU provides complete remote operation of the DF system via the four-wire circuit interface. Its main purpose is to obtain aircraft bearing information (from up to 24 DF antennas) and present the

aircraft information along with support information to the operator so that guidance can be provided to the aircraft. Each operating position has the capability to control and monitor up to 24 different DF facilities. The operator's position consists of a 15-inch diagonal display monitor, a keyboard, and a trackball. The monitor displays both multi-color graphics and alphanumeric data in operator controlled quantities and sizes. The keyboard is detachable and contains specially programmed hard function keys. A trackball is provided for positioning a cursor on the operating display (the arrow keys on the key board may be used).

f. Remote Maintenance Monitor and Control Unit.

(1) This unit consists of both hardware and software which is integral to both the bearing processor equipment and the IDCU. The RMMC is capable of accommodating up to four operating IDCU positions in addition to maintenance and training functions. The RMMC functions are provided through a stationary maintenance terminal and keyboard located in the AFSS maintenance room. The following functions will be accomplished by this system:

(a) Monitor equipment parameters.

(b) Perform periodic maintenance tasks.

(c) Perform certification tasks.

(d) Perform diagnostic testing to line replaceable unit (LRU) level.

(e) Support fault isolation to LRU level.

(f) Remote control specified equipment parameters and functions.

(g) Provide continuous monitoring of facility status.

(h) Provide two-way audio intercom with soft tone enunciator alert between RMMC at the IDCU and the Receiver and Bearing Processor Unit.

(2) The results of these functions will be available at ports for a monitor with a RS-232 interface. A portable maintenance data terminal (MDT) will interface the remote monitoring subsystem (RMS) functions within the RMMC unit at ports located in the RMMC rack at the AFSS and in the

receiver/processor rack at the antenna site. The RMS interface with the MPS will be in accordance with NAS-MD-790, Revision A, Remote Maintenance Monitoring System Interface Control Document, Maintenance Processor Subsystem to Remote Monitoring Subsystems and Remote Monitoring Subsystem Concentrators.

g. Battery Charger Power Supply. This equipment will provide the primary 24 vdc power to the receiver and bearing processor unit. In addition, it will provide charging of batteries to maintain uninterrupted operation regardless of the presence or absence of station alternating current (AC) input power. Batteries are provided by the FAA. Automatic load disconnect is provided when AC power is not present and the voltage of the battery bank drops to a 50 percent discharge condition. The load will automatically reconnect when commercial power is restored. The BCPS is designed to be mounted in the same equipment rack as the receiver and bearing processor unit. The BCPS will be capable of satisfactory operation in the absence of a battery bank and can be certified as well.

h. DF Simulator Trainer System. A simulator trainer system will be provided for training of flight service specialist DF operators. The trainer will be a stand-alone system capable of duplicating all DF system operational functions including running AFSS site specific data base software. The student position will use the standard FA-10123 IDCU console which will interface with a special instructor's console. The instructors console will house the DF simulator computer which will also run instructor controlled training scenarios, training data storage and playback, alphanumeric and graphics monitors, control keyboard, and trackball. Audio interphone connection between the students console and the instructors console will be provided with record and playback capabilities. A simulator trainer will be provided for each AFSS as well as multiple units for the FAA Academy Air Traffic training facility.

32. SYSTEM REQUIREMENTS. The VHF DF system will consist of equipment installed at the antenna site and in the AFSS. The receiver control cabinet and preamplifier/filter will be located in a shelter together at the antenna site. The IDCU and local RMMC equipment rack will be installed in the AFSS buildings. The installation will be made in accordance with Order 6530.11, VHF DF Installation Standards, and related standards dealing with lightning and transient protection for facilities and equipment, FAA Standards 019b, Lightning Protection Grounding, Bonding and Shielding, Requirements for Facilities and 020a, Transients Protection, Grounding, Bonding, and Shielding Requirements for Equipment.

a. Antenna Site.

(1) The receiver and bearing processor unit, preamplifier/filter, and battery supply will require a shelter, if not collocated in the same building with a facility such as a VOR with Tactical Air Navigation equipment (VORTAC) or other existing facility. The receiver and bearing processor resides in the receiver control cabinet along with the power source. The cabinet enclosure accommodates 19-inch standard panel mounted chassis. The receiver control cabinet outer dimensions are: 83 x 22 x 26 inches and weighs 625 pounds.

(2) The preamplifier/filter will also be in the same shelter as the receiver control cabinet. Its dimensions are: 65 x 34 x 14 inches and mounted to a smaller 12-inch high floor mounted pedestal. The unit weighs about 205 pounds.

(3) Power for this equipment is supplied by a positive 24 vdc 480 Watt nickel cadmium battery power source. Batteries will be charged by a 120 volts alternating current (vac) 60 Hz filtered power supply to provide 24 vdc at 23 amperes.

b. AFSS Site. The equipment located in the AFSS building will consist of up to four IDCU operator terminals next to the in-flight positions. These terminals will be mounted in standard consoles. A table top terminal and printer will be located in the equipment room to be used for RMM. In the equipment room, the DF and local RMMC processors, modems, ethernet, and power supply, will be mounted on a standard rack of 22 x 72 x 28 inches in dimension. The simulator trainer will be installed in the training laboratory or at a separate location conducive to training, as determined by the AFSS manager. The power supply requirements will be 120 vac at 60 Hz.

33. EXTERNAL INTERFACES.

a. External Interfaces. The external interfaces consist of a four-wire voice/data circuit to the remote maintenance monitor and interface to the remote monitoring subsystem concentrator (RMSC)/MPS. The four-wire circuit interface will be designed to match the electrical requirements of the specifications for the unconditioned 3 kHz voice grade zero/zero transmission level point (TPL) circuits. This circuit will interface the bearing control processor unit at the DF antenna/receiver site and the RMMC equipment located at the AFSS facility. The circuit interfaces shall meet the requirements of Electronic Industries Association Standards RS-449 and RS-334.

b. Remote Monitor Interface. The remote monitor interface to the RMS/MPS will consist of RS-232C interface modem carrying synchronous, binary digit (bit) oriented transmissions at 2400 bits per second (bps). The information transfer shall be in accordance with NAS-MD-790, Revision A, dated June 30, 1992. Apart from the RMSC/MPS/MDT, there are no other external interfaces with NAS equipment or systems.

c. Maintenance Data Terminal. There will be an RS-232C interface port on the receiver/bearing processor rack at the DF antenna/receiver site that will provide access for onsite diagnostics with the standard portable MDT microprocessor.

34. FA-9964 INTERFACE. The new VHF DF system shall interface with the FA-9964 DF equipment as shown in Figure 3-2, VHF DF Network Interface Block Diagram, described in subparagraphs a-c.

a. Maintenance Alert Signal. The FA-9964 DF equipment has built in monitoring equipment which develops an alert signal to the RMMC interface upon detection of a deterioration of the antenna site bearing processor performance. Any further degradation of the antenna system results in alarm signal to the RMMC interface. In addition, any time an azimuth error alarm exists the antenna automatically generates a maintenance alert.

b. Shutdown Signal. System shutdown signals are developed by the DF antenna/receiver facility subsystem monitor equipment and sent to the FA-9964 interface to the integrated voice/data modem which provides signal data connective by four-wire Telco circuit to the AFSS DF Network RMMC modem.

c. Antenna Reset. An antenna reset function is provided to initiate an antenna reset signal through the AFSS Network RMMC interface modem via Telco circuit to the FA-9964 antenna/receiver site interface modem. This signal will re-start the FA-9964 system and restore the system to operation following a brief maintenance alert or intermittent fault which may cause an antenna/receiver site shutdown to occur.

35. EQUIPMENT TYPE DESIGNATORS. The type designators for the VHF DF equipment delivered under this project are as follows:

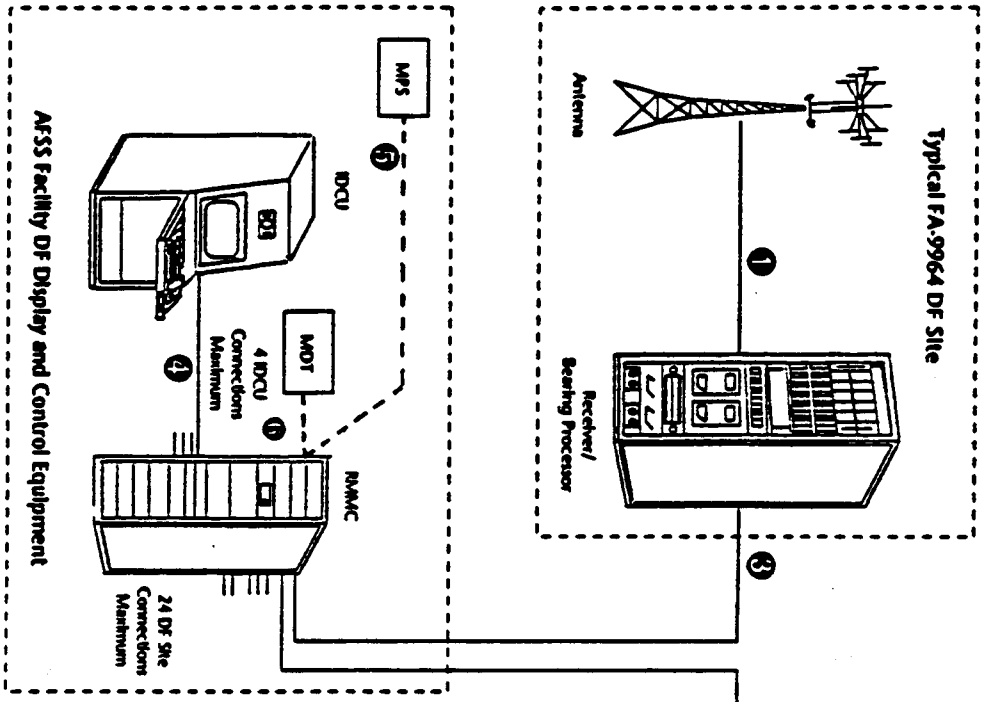
a. Receiver/Bearing Processor Group, Type FA-10121.

b. Antenna SubSystem, Type FA-10122.

c. AFSS RMMC/IDCU SubSystem, Type FA-10123.

36.-39. RESERVED.

FIGURE 3-2. VHF DF NETWORK INTERFACE BLOCK DIAGRAM



1. Antenna to Pre-Amp or Receiver/Bearing Processor - RF/Voice hardline
2. Pre-Amp to Receiver/Bearing Processor - RF, Voice hardline
3. Bearing Processor to RMMC - Bearing and Control Data/Voice Telco Lines
4. RMMC to IDCU - Bearing and Control Data/Voice hardline
5. RMMC to MPS - Control/Maintenance Data Telco Lines
6. Bearing Processor to MDT - Control/Maintenance Data hardlines
   RMMC to MDT - Control/Maintenance Data hardlines

CHAPTER 4. PROJECT SCHEDULE AND STATUS

40. GENERAL. The VHF DF network will be provided replacement equipment for 112 tube-type systems under this acquisition program. The first three systems were delivered in 1988 and installed at the FAA Academy and FAA Technical Center. These were pre-production systems for testing purposes. The first production unit delivery made to a field sites was Millville, New Jersey, in May 1989, for operational test and evaluation (OT&E). The second system was delivered to Green Bay, Wisconsin, in November 1989 for additional OT&E. Antenna receiver sites were installed at Eau Claire, WI, and Marquette, MI, November 1992 in the Green Bay network. The remaining antenna and receiver site equipment sets were shipped to the FAA Logistics Center for storage pending deployment decision. The remaining 62 AFSS equipment sets were completed in September 1992, and delivered in place pending enhancements modification. Following acceptance of the enhanced system, the initial system delivery to a region will require approximately 1 month for equipment preparation after an approved deployment decision. Subsequent system deliveries should be at a rate of one system per month per region. The first system installation in each region is expected to require approximately 2 months to install and certify. A target of less than 4 weeks should be achieved by subsequent installations. The equipment delivery is projected to be completed by October 1994, with the final site becoming operational in 1995.

41. MILESTONE SCHEDULE SUMMARY.

TABLE 4-1. SUMMARY OF MAJOR PROCUREMENT EVENTS

Event	Date
Acquisition Plan Approved	06-01-83
Phase I Contract Award	10-19-84
Phase II Contract Award	04-18-85
Phase III Production Contract Award	05-01-87
First Production System Delivery	03-15-89
Enhancements Modification Delivery/Testing	11-17-92
OT&E Green Bay, WI.	06-25-93
Initiate EXCOM Process	07-12-93
Simulator Trainer, First Article Testing	07-20-93
First Operational Readiness Demonstration (ORD)	09/93
RMS/MPS Interface Contract Award	09/93
Simulator Trainer, First Production Article	10/93
Last DF System Delivery	10/94
RMMS OT&E/Integration Testing	09/95
Last System Commissioned	10/95

42. DELIVERY SCHEDULE. The planned VHF DF delivery schedule (as of July 30, 1993) is shown in Appendix 1, VHF DF Delivery Schedule, and is provided to aid in planning and supporting for the project. All 61 AFSS locations and the initial 112 DF antenna/receiver facility locations are provided. It must be clearly understood that the installation of the FA-10121 system dictates that a minimum of one FA-10121 antenna/receiver facility must be connected to each of the AFSS VHF DF facility networks and the new antenna/receiver equipment will be deployed to replace an established FA-5530 DF system or a relocation project associated with an existing FA-5530 DF system. An exception to replacing only FA-5530 equipment, AFSS DF Networks having only FA-9964 equipment will have one site replaced and the FA-9964 will be relocated to replace older equipment in another AFSS Network. The initial effort for each network will be the AFSS equipment installation. Replace and relocate projects are identified in appendix 1, EFFORT column as "Replace/R" which in most cases will replace FA-5530 equipment and relocate the facility to a new site. The use of the word "Establish" in the EFFORT column indicates the relocation and replacement of FA-5530 or older facility equipment into a new AFSS DF network. It should be noted that delivery of the RF Pre-amplifier/Filter subsystems does not appear in appendix 1, as this subsystem will only be deployed on an "as requested" basis. The Delivery Date column will be updated as the need becomes appropriate.

43. INTERDEPENDENCIES AND SEQUENCE. The type designators for the VHF DF equipment delivered under this project are as follows:

a. FA-10121, Receiver/Bearing Processor Group.

b. FA-10122, Antenna Subsystem.

c. FA-10123, RMMC/IDCU Subsystem.

44. SIMULATOR TRAINER DELIVERY SCHEDULE. The FA-10121 VHF DF Simulator Trainer planned delivery schedule is contained in appendix 2 of this order.

45.-49. RESERVED.

CHAPTER 5. PROJECT MANAGEMENT

50. PROJECT MANAGEMENT, GENERAL. This paragraph describes the organizations within the Office of the Associate Administrator for NAS Development (AND) that are directly responsible for the VHF DF program management.

a. Associate Administrator (AND-1). The Associate Administrator's office manages, directs, and executes the FAA's engineering and management activities related to the design and establishment of air navigation facilities, landing aids, and air traffic control facilities and equipment to ensure that the NAS is efficient, economical, and responsive to operational needs.

b. Navigation and Landing Program (ANN-1). This organization is the principal element within the Office of the Associate Administrator responsible for the development and implementation of systems, programs, and facilities requirements for navigation and landing systems.

c. Navigation and Visual Systems Engineering Division (ANN-600). This organization is the principal element responsible for technical quality and integrity of and resource requirements for the project. The division manager is responsible for supervisory management of technical resources required to accomplish the development and review of procurement acquisition package, i.e., specifications, statement of work, purchase requests, contract documentation requirements lists, and PIP's.

d. Navigation Program Manager (ANN-300). This organization is the principal element responsible for design, procurement, and implementation responsibilities for aids to navigation. The program manager (PM) is supported by matrix organizations which are essential to successfully accomplish the elements of their charter which are:

(1) The PM is responsible for the overall management and direction of all FAA activities necessary for successful development, acquisition, production, test and evaluation, transition to user organization, and engineering support of the navigation program.

(2) The PM is responsible for the definition of program needs for the navigation program. This includes definition of tasks to be performed and expected results, staffing estimates, contract cost estimates, budget estimates, schedules, management procedures and controls, and required equipment and facilities.

(3) Establishes matrix support agreements and holds functional organizations accountable for integrated logistics support, facilities planning, production quality and planning, test and integration, contracting, and legal.

(4) Ensures timely preparation and submission of reports relative to established cost, schedule, benefit, and budget baseline to higher authority.

e. Business Manager for Navigation (ANN-302). The Business Manager for Navigation is the principle advisor to the PM and is responsible for providing, on the PM's behalf, executive control and direction in all areas of project planning, budget execution, developing cost data, controlling assigned funds, program coordination and schedules necessary to accomplish the implementation of assigned projects. The business manager drafts and coordinates the development of matrix support agreements and program directives; coordinates the matrix team efforts in National Airspace Integrated Logistics Support (NAILS), facility planning, cost benefit analysis, testing and integration, contracting, and legal matters.

f. Associate PM Engineering (ANN-600). The Associate Program Manager for Engineering (APME) has overall management direction for acquisition of the VHF DF System. The APME is responsible for the quality and technical integrity of the project. The APME is also responsible for the day-to-day management of the VHF DF project from inception to facility commissioning. These responsibilities include:

(1) Management. Planning, scheduling, and managing the program from budget submission to development of procurement documentation through contract award, system deployment, and commissioning.

(2) Logistics Support. Provides, in conjunction with the NAILS Management Team (NAILSMT), technical guidance to define logistic support requirements, including provisioning, training, and documentation through contract award, system deployment, and commissioning.

(3) Technical Officer. Providing engineering support, advice, and consultation to the contracting officer (CO) during procurement and contract management.

(4) Testing. Takes lead in the review, coordination, and approval of the contractor's proposed testing program. Coordinates with other responsible organizations in development, review, and approval of test procedures designed to demonstrate total NAS deployment acceptability of the VHF DF system.

51. PROJECT CONTACTS. This paragraph lists the VHF DF project contacts and their routing symbols and telephone numbers.

a. Program Director for Navigation and Landing. Rodman Gill, ANN-1, FTS/Commercial (202) 267-6595.

b. Division Manager for Navigation and Visual Systems Engineering. Robert Bernard, ANN-600, FTS/Commercial (202) 267-6511.

c. Program Manager for Navigation. Charles B. Ochoa, ANN-300, FTS/Commercial (202) 267-6672.

d. Business Manager for Navigation. Sonja Whitson, ANN-302, FTS/Commercial (202) 267-6723.

e. Associate Program Manager for Engineering and Project Technical Officer for VHF DF. Grigorie Rugila, ANN-600, FTS/Commercial (202) 267-6569.

52. PROJECT COORDINATION. The VHF DF program requires coordination with other Washington office organizations, with regional Airway Facilities, Logistics, and Air Traffic division personnel and with the prime contractor.

a. Systems Plans and Programs Division (ATR-100). ATR-100 provides air traffic requirements for DF systems, supports the program office by reviewing system acquisition documentation from an operational point of view, supports OT&E, and coordinates training requirements for flight service specialist with Air Traffic's, Training Requirements Program Division, ATZ-100 and Training and Higher Education's, Air Traffic Training Program Division, AHT-500. ATR-100 participates in the Deployment Readiness Review (DRR) process.

b. Maintenance Engineering Division (ASM-100). ASM-100 reviews procurement specifications to ensure the design meets the reliability and maintainability requirements and supports the general maintenance philosophy. ASM-100 also coordinates the development of maintenance standards and plans for implementation of maintenance concepts and provides test equipment for existing or other than new establish projects.

c. Maintenance Operations Division (ASM-200). ASM-200 participates in the development and review of maintenance plans. In addition, ASM-200 develops national Airway Facilities sector staffing standards for the VHF DF program and validates the maintenance staffing requirements. ASM-200 participates in the development of an integrated logistic support plan (ILSP) for the VHF DF acquisition and develops maintenance standards and plans for implementation of maintenance concepts.

d. Telecommunications Management and Operations Division (ASM-300). ASM-300 is responsible for planning, engineering, providing, and maintaining the interfacility telecommunications.

e. NAS Support Division (ASM-700). ASM-700 develops, recommends, and issues agency procedures, standards, and policies for material management, supply support, transportation, personal property management and real property acquisition, management and disposal.

f. National Engineering Field Support Division (AOS-200). AOS-200 prepares the shakedown test and evaluation (ST&E) requirements and test plans and conducts the ST&E on the first VHF DF system. After system deployment, they are responsible for national documentation, equipment instruction book changes, equipment modifications, and field engineering support.

g. Navigation/Spectrum/Power Systems Division (ACW-300). ACW-300 will appoint an Associate Program Manager for Test (APMT) who will oversee Development Test and Evaluation (DT&E), initial Production Acceptance Test and Evaluation (PAT&E), OT&E, and serve as the PM's focal point for project testing. The APMT will review, monitor, and report on contractor DT&E activities, prepare, conduct, and report on OT&E integration and operational testing, and coordinate, review, and support the OT&E/shakedown activities as required. The APMT will ensure that all testing requirements are met. In addition he/she will coordinate with ANN-600 in the development of the FAA Master Test Plan.

h. Contracts Division (ASU-300). ASU-300 performs cost/price analyses of contractor's proposals and participates as member of the source evaluation board. In addition, ASU-300 provides procurement support for the VHF DF program and plans, awards, and administers contracts for VHF DF equipment. ASU-300 also designates a contracting officer, who is responsible for all contractual matters. The contracting officer is the only individual authorized to approve contract changes.

i. Industrial Division (ASU-400). ASU-400 performs factory inspection of the VHF DF equipment. ASU-400 assigns a quality reliability officer (QRO) at the time the contract is awarded. The QRO is the FAA representative at the contractor's facility and is responsible for verifying quality control. The QRO is directed by FAA policy and procedure and by the terms and conditions of the contract.

j. FAA Academy (AMA-1). AMA-400 provides Airway Facilities maintenance training and coordinate requirements with ASM-200 and AHT-400. AMA-500 provides air traffic operations training and coordinates the training requirements with ATZ-100 and AHT-500 in development of training plans.

k. Airway Facilities Training Program Division (AHT-400). AHT-400 analyzes training proposals prepared by ASM-200 and initiates action to meet training requirements.

l. Air Traffic Training Program Division (AHT-500). AHT-500 analyzes ATZ-100 proposed air traffic training and initiates action to meet those requirements.

m. Maintenance Automation Division (ANA-200). ANA-200 develops, recommends, and issues agency procedures, standards, and policies for the RMMS interface including the MPS to the RMS, the RMSC, and the MDT.

n. Facilities Integration Division (ANS-200). ANS-204, Airway Facilities Program Manager for Environment and Safety, provides technical guidance and operating procedures to regional facilities personnel regarding compliance with environmental and safety statutes.

o. NAILS Program Division (ANS-400). ANS-400 develops, monitors and implements NAILS policy, standards, plans and guidelines. In addition, ANS-400 assigns an Associate Program Manager for Logistics (APML) to support the PM by establishing coordinating and conducting NAILSMT meetings for NAS acquisition programs; assists in the development of NAILS related procurement documentation; coordinates supportability test requirements for incorporation into program test plans; coordinates review of contractor deliverables to ensure that NAILS requirements are satisfied and reviews and analyses Engineering Change Proposals (ECP) and NAS Change Proposals (NCP) for factors affecting supportability.

p. Office of Environment and Energy (AEE-1). AEE-1 is responsible for development of agency environmental and energy policies and administers the agency's hazardous materials program as appropriate to meet statutory requirements or Departmental policy.

q. Office of Aviation Systems Standards, Airspace System Assurance Division (AVN-800). The Airspace System Assurance Division is responsible for conducting commissioning flight inspections of the VHF DF systems as required to accomplish the following functions:

(1) Determining if the operational status of a facility or system is in accordance with the established tolerances.

(2) Certifying the facility or system for operational use in the NAS when all operational requirements have been met.

(3) When applicable, ensuring that required Notice to Airmen (NOTAM) is issued for any facility or system restriction.

r. FAA Regional Offices. The FAA regional offices, through established administrative structures, coordinate with all responsible parties to assure adequate funding, establish system commissioning/service availability dates, and assigns project field representatives for the VHF DF system. The regions also provide site acquisition and field engineering as required to support the preparations for the installation of the VHF DF equipment; order Government Furnished Material (GFM) for tools to support the VHF DF installation and acceptance; tailor installation drawings to site specific; initiate work orders and travel authorization; and assign field personnel. The regional offices are responsible for the coordination required to accomplish the following listed functions:

(1) Regional Airway Facilities Division (AXX-400).

(a) Completing and certifying all Environmental Assessment and Environmental Due Diligence Audits as required by applicable laws and regulations. This requirement applies to all new and relocate facility sites as well as the expansion of or adding equipment to an existing facility site.

(b) Providing the engineering support for facility site selection, acquisition, and preparation; and installation of facilities systems and equipment in accordance with established standards, specifications, and instructions.

(c) Notifying the appropriate sector that a project has been funded and issuing a projected implementation schedule.

(d) Providing the sector an opportunity to review and participate in project plans during the engineering phase and for furnishing the sector a copy of the engineering plans and contract documents.

(e) Providing the sector a copy of the project work order at least 10 days before the start of project work.

(f) Providing the appropriate facility reference data file (FRDF) information to the sector for inclusion in the FRDF. These data requirements will be established by National Engineering Field Support Division, AOS-200, as part of ST&E.

(g) Notifying the joint acceptance inspection (JAI) board chairman of when the facility will be ready for JAI, providing the sector all data necessary to prepare warranty failure reports on items failing prior to JAI, and providing regional Airway Facilities division representatives for participation in the JAI.

(h) Establishing and maintaining a follow-up file for monitoring and clearing all JAI report exceptions, reviewing all JAI reports and follow-up reports for correctness, completeness and proper distribution, taking appropriate and timely actions to clear JAI report exceptions, and identifying additional sources of funds or initiating budgetary action, as necessary, to clear exceptions.

(2) Airway Facilities Sector.

(a) Reviewing contract documents and engineering plans during the engineering phase and providing comments to the regional Airway Facilities division.

(b) Providing personnel as required at appropriate times throughout the project to witness and/or participate in construction, installation, tune-up, tests, and collection of technical reference data.

(c) Providing a representative to serve as the joint acceptance board (JAB) chairperson and other qualified personnel for participation in the JAI, preparing the JAI report and making distribution, assuming maintenance responsibilities and custodianship for facilities, systems, or equipment at the conclusion of JAI.

(d) Coordination and follow-up on exceptions after the JAI to include exceptions assigned to other organizations or to a contractor for clearance, clearing exceptions which have been assigned to the sector, reporting the clearance of exceptions, and reviewing all waived exceptions to determine if actions will impact sector operations or other organizations.

(e) Maintaining all equipment warranty information and reporting equipment failing under warranty.

(f) Receiving, storing, and shipping project materials and disposing of excess equipment and materials.

(3) Regional Air Traffic Division (AXX-500).

(a) Providing personnel as required at appropriate times throughout the project to witness and/or participate in system tests and collection of operational reference data.

(b) Providing a representative to serve as the Air Traffic representative on the JAI board.

(c) Coordinating training requirements for flight service specialist with the FAA Academy and the AFSS.

(d) Coordination and follow-up on exceptions after the JAI to include exceptions assigned to other organizations or to a contractor for clearance, clearing exceptions which have been assigned to the sector, reporting the clearance of exceptions, and reviewing all waived exceptions to determine if actions will impact system operations.

(4) AFSS.

(a) Providing personnel as required at appropriate times throughout the project to witness and/or participate in system tests and collection of operational reference data.

(b) Providing a representative to serve as the Air Traffic AFSS representative on the JAI team.

(c) Coordinating training requirements for flight service specialists with the Air Traffic divisions and the FAA Academy.

(d) Coordination and follow-up on exceptions after the JAI to include exceptions assigned to other organizations or

to a contractor for clearance. Reporting the clearance of exceptions, and reviewing all waived exceptions to determine if actions will impact the DF system operations.

(e) Assuming responsibilities for operational custodianship of the DF systems or equipment at conclusion of JAI.

(5) Regional Logistics Division (AXX-50).

(a) Ensure that all environmental requirements have been completed for the site requested by the Airway Facilities division.

(b) Acquire the sites determined most suitable by the Airway Facilities division.

(c) Contract for and review site preparation and facility construction in accordance with plans and specifications provided by the Airway Facilities division; and provide an active participant for the JAI.

(d) Procure all Government Furnished material.

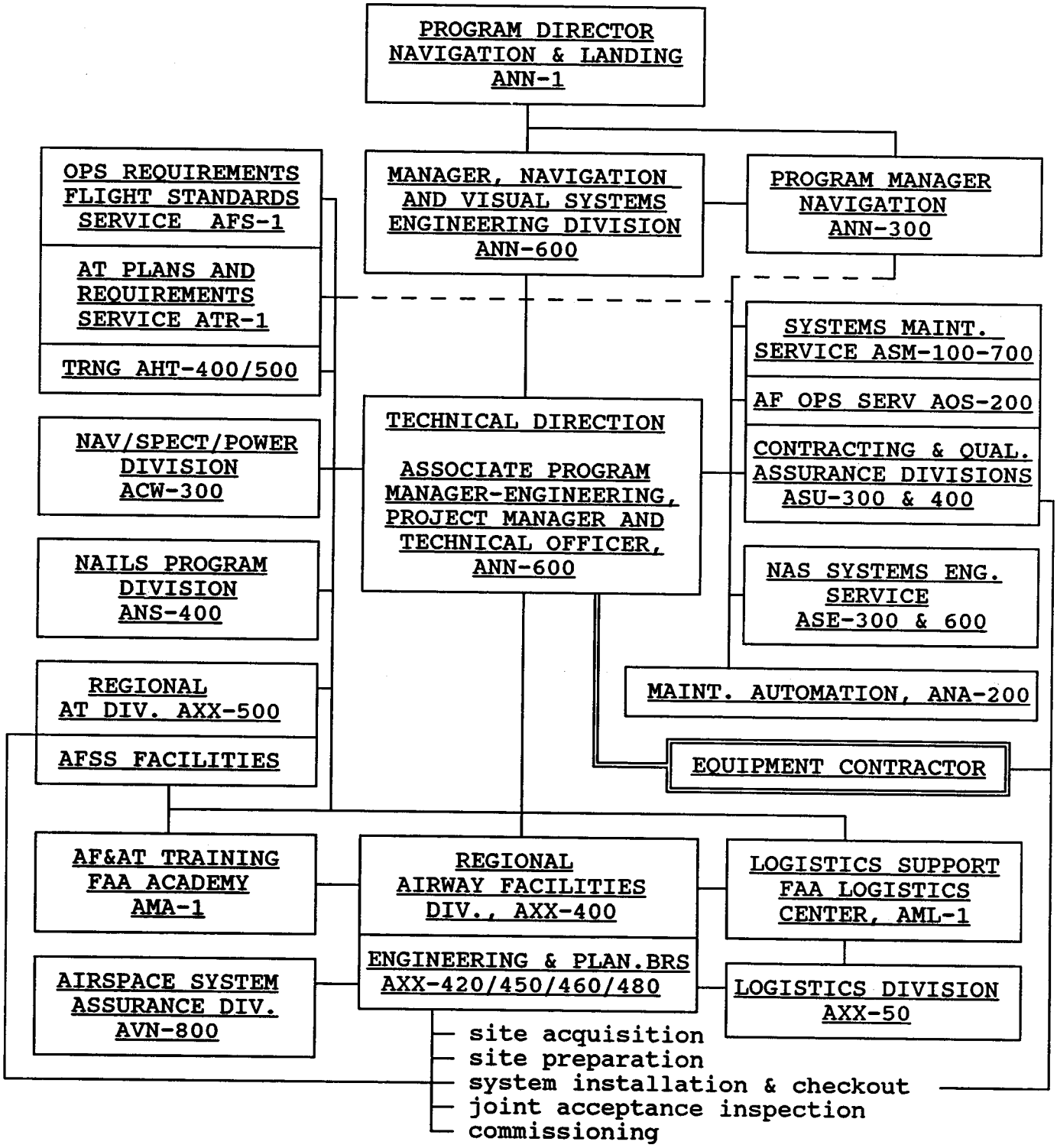
(e) Close out project records to capture project costs for real and personal property.

53. PROJECT RESPONSIBILITY MATRIX. Figure 5-1, Project Responsibility Matrix, illustrates the FAA organizations responsible for the implementation of each significant function of the VHF DF project.

54. PROJECT MANAGERIAL COMMUNICATIONS. The VHF DF project manager within ANN-600 is the focal point for all technical project communication. Organizations supporting the DF project designate a representative to maintain close communication with the Direction Finder System Program Office. Supporting organizations maintain communications within FAA but never directly with the contractor without the CO's permission.

a. The National Airspace Integrated Logistics Support Conferences. These conferences are held to ensure that there is an interrelated, unified, and iterative approach to managerial and technical activities which support the NAS. During these conferences issues affecting logistics management, maintenance planning, supply support, test and support equipment, manpower

FIGURE 5-1. PROJECT RESPONSIBILITY MATRIX



Note: Matrix interface - dash line

and training support, support facilities, technical data, and packing, handling, storage and transportation are discussed and resolved. These meetings can be held at FAA headquarters, FAA Logistics Center, or contractor facility on an annual basis.

b. Program Directors Status Review Board. These board meetings are held on a bimonthly basis at the FAA headquarters to discuss project status and to resolve problems and issues affecting all phases of the project from the time requirements are established until system deployment has been completed.

55. IMPLEMENTATION STAFFING. There are no requirements peculiar to the implementation phase of the project.

56. PLANNING AND REPORTS.

a. Planning. None.

b. Reports. No scheduled reports required for this project.

57. APPLICABLE DOCUMENTS. The following documents have been referenced and the current version of these documents are applicable to the implementation of the VHF DF replacement project.

a. FAA-420-02 Revision No. 4, Purchase Description - Direction Finder Replacement and Modernization.

b. FAA-G-1210-d, Provisioning Technical Documentation.

c. FAA-G-1375-c, Spare Parts-Peculiar for Electronic, Electrical, and Mechanical Equipment.

d. FAA-G-2100e, Electronic Equipment, General Requirements.

e. FAA-Std-019b, Lightning Protection Grounding, Bonding and Shielding Requirements for Facilities.

f. FAA-Std-020a, Transients Protection, Grounding, Bonding, and Shield Requirements for Equipment.

g. FAA-Std-036a, Preparation of Project Implementation Plans.

h. NAS-DD-1000B, Level I Design Document.

i. NAS-MD-110, Test and Evaluation (T&E) Terms and Definitions for the National Airspace System.

j. NAS-MD-790 Revision A, Remote Maintenance Monitoring System Interface Control Document, Maintenance Processor Subsystem to Remote Monitoring Subsystems and Remote Monitoring Subsystem Concentrators, with SCN 1 and 2.

k. NAS-MD-792, Operational Requirements for Remote Maintenance Monitoring System.

l. NAS-MD- 793, Remote Maintenance Monitoring System Functional Requirements for Remote Monitoring SubSystem.

m. Order 1050.1D, Policies and Procedures for Considering Environmental Impacts.

n. Order 1800.8F, NAS Configuration Management.

o. Order 1800.58A, National Airspace Integrated Logistics Support Policy.

p. Order 1800.63, NAS Deployment Readiness Review Program.

q. Order 1810.4B, FAA NAS Test and Evaluation Policy.

r. Order 3120.4, Air Traffic Training.

s. Order 3400.3E, Airway Facilities Maintenance Personnel Certification Program.

t. Order 4250.9, Field Inventory Management and Replenishment Handbook.

u. Order 4420.4, Land Acquisition.

v. Order 4560.1B, Policies and Procedures Covering the Provisioning Process During the Acquisition of FAA Material.

w. Order 4620.3C, Initial Support for New or Modified Equipment Installations.

x. Order 4650.7A, Management of Project Materials.

y. Order 4660.8, Real Property Management and Disposal.

z. Order 4800.2B, Utilization and Disposal of Excess and Surplus Personal Property.

aa. Order 6000.15A, General Maintenance Handbook for Airway Facilities.

bb. Order 6000.26A, Reliability and Maintainability Policy.

cc. Order 6030.45, Facility Reference Data File.

dd. Order 6200.4D, Test Equipment Management Handbook.

ee. Order 6530.10, Maintenance of FA-10121 VHF Direction Finder equipment.

ff. Order 6530.11, FA-10121 VHF DF Installation Standards Handbook.

gg. Order 6950.2C, Electrical Power Policy Implementation National Airspace System Facilities.

hh. Order 7210.45, Air Traffic Employees in Enroute, Terminal, and Flight Service Station Facilities Handbook.

ii. Order 7220.1A, Certification and Rating Procedures Handbook.

jj. Order 8200.1, United States Flight Inspection Manual, with 46 Changes.

58.-59. RESERVED.

CHAPTER 6. PROJECT FUNDING

60. PROGRAM FUNDING STATUS.

a. The VHF DF Acquisition Paper. The acquisition paper received Department of Transportation (DOT) approval following concurrence by the Transportation System Acquisition Review Committee (TSARC). A solicitation for the system equipment was released on June 16, 1983, and contract award was made October 19, 1984. The System Program Plan (SPP) and System Implementation Plan (SIP) was completed and released for agency distribution, January 12, 1988. Revision and updating the SPP/SIP required extensive changes to the order due to FAA reorganization, implementation of matrix management concept, and changes in delivery schedules. Therefore, the SPP/SIP revision and update was formatted to FAA order format complying with FAA STD-036a, Standard for Preparation of Project Implementation Plans.

b. The Total Estimated Cost. The total estimated cost for the program as shown in the acquisition paper is $103,400,000. The FAA's current congressional budgetary estimate for air traffic control (ATC) facilities include funding for the VHF DF program at a total of $106,400,000. Table 6-1, Funding Summary, is a funding profile for the program.

61. BUDGET SUBMISSION REQUIREMENTS. The major elements of the acquisition plan which will impact funding are:

a. FAA headquarters. The FAA headquarters multiyear procurement that includes required testing and documentation, installation support of the initial systems at the FAA Logistics Center, the FAA Academy, and the FAA Technical Center, initial training, and contractor installation for the first ORD site. Required site project support material will be specified and procured by the FAA headquarters and made available for regional installation.

b. FAA Academy. The FAA Academy received the first system equipment. These systems will be used for training facilities for training of maintenance technicians and a cadre of flight service specialists. Contractor provided training material and courses will be the basis for development of VHF DF maintenance training. The contractor will provide the initial 10 training classes at its facility. The contractor will also provide an operator's user guide and VHF DF Simulator Trainers to be used by the FAA Academy, Air Traffic Branch to develop a training course for AFSS specialists.

c. National Engineering Field Support Division (AOS-200). The Navigation Branch, AOS-240, received a VHF DF system equipment which will be used to support maintenance engineering and field support of the VHF DF throughout the equipment life cycle.

TABLE 6-1. FUNDING SUMMARY

FUNDING SUMMARY		
Item	Washington Headquarters	Regions
Requirements VHF DF PROGRAM (Phase I, II and III, 1st Buy):		
Procure 115 VHF DF Systems, including spare parts and optional items to support the program.	$58,300,000	
Procure 70 Simulator Trainer Stand-alone Systems	$ 5,400,000	
Procure System Enhancements Software/Hardware for all AFSS FA-10123 DF Subsystem	$ 4,800,000	
Site acquisition, site preparation, installation and implementation (including site surveys, foundation fabrication, trenching, pedestals, cables, and engineering costs).		$37,900,000
TOTALS	$68,500,000	$37,900,000

Funding estimates reflect planned milestones subject to availability of funds. The cost estimates include ancillary items which are required to support the VHF DF program, such as interfacility cables and ancillary devices which may not be included in the budget items at sufficient levels.

d. FAA Logistics Center (AML). The FAA Logistics Center will receive a system for depot level support of the VHF DF equipment. Training may be provided for the FAA Logistics Center technician through On-the-Job Training (OJT) at the contractors facility, under the contractor repair services provision.

e. Regional Engineering (AXX-400). The regional Airway Facilities divisions will be responsible for site acquisition and surveys to meet operational requirements, site preparation, and construction as required, equipment installation and checkout, and certification, based on FAA headquarters-supplied engineering requirements.

f. Contractor Installation. The Technical Support Services Contractor (TSSC) responsibilities will include the equipment installation, checkout, and certification, all witnessed by qualified FAA personnel and representatives.

g. Maintenance Staffing. As has been noted, the VHF DF equipment is being procured to specifications that should lead to significantly lower maintenance requirements than existing tube-type equipment. It is anticipated that a reduction of certification requirements and other maintenance tasks will reduce the work load. For current planning, until actual experience is gained, maintenance staffing is estimated at less than one-quarter man-year per system.

62.-69. RESERVED.

CHAPTER 7. DEPLOYMENT

70. GENERAL DEPLOYMENT ASPECTS. The current VHF DF contract provides equipment for 61 AFSS networks, replacing 112 tube type FA-5530 DF antenna/receiver sites and new network information display and control equipment for all 61 AFSS facilities. The first three system deliveries were pre-production prototype equipment used in development test and evaluation (DT&E) at the FAA Technical Center. Following DT&E, these units were transferred to AMC and installed for use as training facilities. The replacement of pre-production equipment was completed March 1992, with installation of production type equipment for the FAA Academy and AOS-200. The unit installed at the Air Traffic Training Branch, AMA-570, will be replaced with simulator trainer units when production units become available in early October 1993. The first production type equipment for field sites was delivered in May 1988 to Millville, New Jersey, AFSS for testing. A second system was deployed to a field site at Green Bay, Wisconsin, AFSS in November 1989 for further OT&E. Further deployment of the DF system was stopped until the deficiencies found in the February 1990, Green Bay, OT&E could be identified and corrected. The VHF DF facilities will be retrofitted with RMS/MPS interface capability when development and testing is completed.

a. Enhancements Modification. Prior to further equipment deployment, a contract modification was awarded to provide system enhancements and requirements requested by the Air Traffic organization. Delivery of the system enhancements modification will be the key factor in the DRR and the ultimate decision to deploy the system. The enhancements modification completed scheduled testing at Green Bay AFSS, June 25, 1993, with a decision to deploy the system expected in September 1993.

b. VHF DF System Deployment. Deployment of the VHF DF Systems is administered by the FAA PM and staff. The enhanced equipment will be accepted at the contractor's factory and shipped at FAA expense to each designated site by FAA Government Bill of Lading (GBL) which will include provisions for unloading. The region should make preparations to provide storage (if necessary) until installation can be accomplished. It is expected that the initial system delivery to any region will require approximately 2 months from equipment delivery to a prepared site to an operational turnover. Subsequent systems delivered to that same region should take less time to install and certify. A target of less than 4 weeks should be achieved. The final VHF DF site in this replacement program is scheduled to be operational by the last quarter of calendar 1995.

71. DEPLOYMENT READINESS REVIEW. Deployment critical key project milestone sequence of events are shown in Table 7-1, VHF DF DRR Key Events Schedule. This table depicts the current estimated schedule of efforts leading to the system deployment decision.

TABLE 7-1. VHF DF DRR KEY EVENTS SCHEDULE

	Event	Date
1.	Acquisition Plan Approved	06-01-83
2.	Production Contract Award	05-01-87
3.	First System Delivery	03-15-89
4.	Enhancements Modification Delivery for Acceptance Testing	11-17-92
5.	OT&E Green Bay, WI.	06-25-93
6.	Simulator Trainer, First Article Testing	07-20-93
7.	DRR EXCOM	09-93
8.	First ORD	09-93
9.	RMS/MPS Interface Contract Award	09-93
10.	Simulator Trainer, First Production Article	10-93
11.	Last DF System Delivery	10-94
12.	RMMS OT&E/Integration Testing	09-95
13.	Last DF System Commissioned	10-95
14.	First ORD for RMS/MPS Interface	01-96
15.	Last ORD for RMS/MPS Interface	09-96

72. SITE PREPARATION. The regions are responsible for site acquisition and preparing the sites where the VHF DF equipment will be installed. Site preparation includes planning for installation and integration with other inter-related subsystems. With reasonable preparation and planning at the regional level, based on FAA headquarters engineering and guidance, the facility

implementation and local site installation support should proceed according to plan. Table 7-2, Regional Engineering Activities, is an example of the activities that occur within a region. The example depicts the VHF DF installation at an existing VHF communication facility, site acquisition not a factor. However, for VHF DF replacements where relocation or site expansion is required, a period of up to 6 months may be required for site acquisition after the desired site is selected. The VHF DF facility must be integrated with the total facility installation, including construction, if applicable. Early installations at each site are expected to take 2 months, but as experience is gained, the time should be reduced to less than 4 weeks.

73. DELIVERY. VHF DF equipment will be direct shipped to the sites. Projected delivery dates will be determined by regional priority with the last delivery scheduled for October 1994. Project implementation estimated completion is October 1995.

a. Training courses. VHF DF training courses will be developed by the contractor and the FAA Academy in accordance with the RMM concept. The courses will be conducted for appropriate personnel in accordance with regional requirements. No more than 2 weeks will be required to complete the course. The technical instruction manual used in the course will be the technical instruction manuals developed by the equipment manufacturer for use in operating and maintaining the equipment. These manuals will have been reviewed for content by the FAA as part of the equipment contract.

b. Supply Support. This is a continuing phase of the operations, beginning with development of a maintenance support concept for the VHF DF, which includes a requirement for certain provisioning documentation. The individual quantity requirements are predicated on a maintenance/support concept based on operational considerations, equipment redundancy, and reliability factors derived from the appropriate system design. Order 4620.3C, Initial Support for New or Modified Equipment Installation, establishes procedures for providing initial allowances of spares, supplies, and working equipment required for the operation and maintenance of new FAA facilities and equipment installations. Site spares will be provided in quantities adequate to meet the requirements of availability and maintainability. Additionally, depot spares will be maintained at the FAA Logistics Center and should be available in accordance with the latest version of Order 4250.9, Field Inventory Management and Replenishment Handbook. All faulty boards, modules, and other components will be sent to the depot only when exchange and repair (E&R) action is required. No major repair of parts will be made onsite.

TABLE 7-2. REGIONAL ENGINEERING ACTIVITIES

Regional Responsibility	Activities	Months: -10 -7 -6 -5 -4 -3 -2 -1	Weeks: TO +1 +2 +3 +4
Site Selection Acquisition Preparation and Construction	Facilities:		
	- Site Survey	▽—▽	
	- Site Acquisition	▽———▽	
	- Site Preparation	▽———▽	
	- Power	▽——▽	
	- Data/comm Circuits	▽——▽	
	- Cabling	▽——▽	
Electronics Installation and Commissioning	Equipment:		
	- Delivery	▽	
	- Installation	▽———▽	
	- Chechout - JAI	▽——▽	
	- Certification - Flight Check	▽—▽	
	-Operational Availability - Commission	▽—▽	

c. Technical Instruction Manuals. Two copies of the manufacturer's technical instruction manuals, TI 6530.10, FA-10121 Receiver/Processor Group and FA-10122 Antenna Group and; TI 6530.11, FA-10123 RMMC/IDCU Group, are to be provided with each VHF DF system. Regional offices and the FAA Logistics Center are to be provided copies of the instruction manuals for the system.

d. Provisioning Documentation. This documentation and spare parts peculiar are included in the contract and will be provided in accordance with current specifications FAA-G-1210d, Provisioning Technical Documentation, and FAA-G-1375c, Spare Parts-Peculiar for Electronic, Electrical, and Mechanical Equipment.

e. Order 4620.3. This order assigns responsibility to the FAA Logistics Center to establish Initial Site Support Allowance Charts (ISSAC) and maintain adequate stock levels to support new or modified equipment installations. The FAA Logistics Center is to use procedures in Order 4250.9 to furnish stock items and the associated requisitioning forms. ISSAC items must be received onsite before the scheduled date of the JAI.

f. Material Accountability. Regions are required to submit FAA Form 4650-12, Material Accountability, to the FAA Logistics Center, in accordance with Order 4650.7A, Management of Project Material, to obtain mechanical preparation of ISSAC items. The FAA Form 4650-12 for each facility should identify the number and type of equipment to be supported. The form should be forwarded to the FAA Logistics Center not later than 3 months prior to the scheduled date of final inspection of the VHF DF system at the site and FAA assumption of short supply responsibility.

g. Maintenance Instructions. Equipment maintenance instructions will be provided in the equipment technical instruction manuals TI 6530.10, FA-10121 Receiver/Processor Group and FA-10122 Antenna Group; TI 6530.11, FA-10123 RMMC/IDCU Group; and Order 6530.10, Maintenance of FA-10121/10122/10123 Direction Finder Facilities. This requires completion of the performance checks described plus general visual checks, cable inspections, and general cleaning. The technical instruction manuals will provide the procedures to be used in accomplishing the performance checks and detail the corrective maintenance procedures. The standards and tolerances will be provided. The guidance contained in the manufacturer's technical instruction manuals will be used for all maintenance activities. The manuals will be updated, as required, to reflect any procedural changes.

74. INSTALLATION PLAN. The FAA regions shall coordinate the receipt, installation, and evaluation of all equipment required to support the VHF DF system implementation. The VHF DF equipment shall be installed in accordance with Order 6530.11, FA-10121 VHF DF Installation Standards Handbook, with national standard drawings and standards revised to fit the individual site. The regional office shall coordinate the complete installation, alignment, and operational tests on all identified VHF DF interfaces to assure full compliance with FAA specifications and performance. If required, the contractor shall be available to provide engineering support services for onsite advice, including technical supervision to the FAA technicians and the installation subcontractors.

75. CONFIGURATION MANAGEMENT PLAN. Configuration Management (CM) is the process used to identify and document the functional and physical characteristics of a configuration item, control changes to those characteristics, and record and report change processing and implementation status. The CM discipline shall be applied to all configuration items included in the VHF DF baseline to ensure compatibility between elements within the network. All additions and changes to the VHF DF baseline shall be proposed in the form of a case file, and shall be reviewed for recommended approval or disapproval by a Configuration Control Board (CCB). All changes to the NAS site design baseline must be processed and approved by the Navigation and Landing Monitoring Cluster (ANN-100) CCB.

a. Acquisition Phase CM. The Navigation and Landing Monitoring Cluster (ANN-100) CCB controls the establishment of, and changes to, the VHF DF hardware baseline during the acquisition phase. For VHF DF matters, the CCB will include members from ANN-130; ASM-100/200/500/700; ASE-100/200/300/600; ATR-100; ACW-300; Airspace System Assurance Division, AVN-800; National Engineering Field Support Division, AOS-200; and Configuration Management Branch, ASE-620. The CCB is responsible for ensuring that the functional, performance, and interface requirements allocated to the VHF DF hardware subsystems are reflected in the baseline, and in any changes to those baselines until product acceptance. The CCB is also responsible for ensuring that baseline documentation is accurate and reflects the VHF DF operational requirements per the baseline specification documentation.

b. CM Transition. The transition of CM responsibilities associated with VHF DF hardware products occurs at acceptance by the CCB designated representative of the contractor's delivered, installed, integrated, and tested hardware product. The change of control functions and CCB records associated with hardware

products that effect the product baseline drawings and instruction books, transition from the ANN-100 CCB to AOS-200. Hardware product acceptance is based on successful ORD of the complete VHF DF system. The AOS-200 retains this CM responsibility throughout the VHF DF system life cycle.

c. Operational Support Phase CM. During the operational support phase, and for the entire life-cycle of the implemented hardware enhancements, CM functions will consist of maintenance and change control management of site as well as product baseline (Level III Design). The AOS-200 CCB assumes baseline and change control management of all VHF DF systems installations as they are commissioned for operational service and of related NAS site design baseline (including logistics and training). The AOS-200 CCB is responsible for change control management of the VHF DF hardware product baseline. Hardware product baseline are maintained by AOS-200 personnel for the field. The contractor shall provide engineering changes to AOS-200 when the changes are released, and prior to field implementation. AOS-200 shall evaluate the changes and approve the change for field implementation via a case file. The CM functions assigned to the AOS-200 CCB are described in the AOS-200 CCB charter.

76.-79. RESERVED.

CHAPTER 8. VERIFICATION

80. FACTORY VERIFICATION. The contractor performed testing in accordance with the requirements of the contract, the equipment specification; FAA-PD-420-02 Revision 4, VHF Direction Finder System; FAA-G-2100e Electronic Equipment, General Requirements; and other documents prior to acceptance of system enhancements modification and the simulator trainer equipment by the FAA. These tests, design qualification tests, type tests, and production tests shall demonstrate that all hardware, software, and all performance requirements are met before the FAA accepts a VHF DF system from the contractor.

81. CHECKOUT. After installation of equipment by the regions, FAA personnel shall conduct checkout tests in accordance with the procedure contained in the contractor developed equipment instruction books. The procedures followed include testing electrical and mechanical hardware interfaces, verifying system performance, maintenance capability, and adequacy of support hardware.

82. CONTRACTOR INTEGRATION TESTING. The contractor provided engineering support services and monitored integration testing at the FAA Technical Center and OT&E testing at sites in Millville, New Jersey, and Green Bay, Wisconsin.

83. CONTRACTOR ACCEPTANCE INSPECTION (CAI). Not applicable.

84. FAA INTEGRATION TESTING. These tests have been conducted to verify that the FA-10121 VHF DF system has been integrated as specified and that it can interface with the FA-9964 VHF DF Antenna/Receiver site equipment. At this point in time, the DF System has been adapted to parameters of the operational equipment with which the network must interface.

85. SHAKEDOWN AND CHANGEOVER. System shakedown is the critical period of testing that shall be performed after the FAA takes full responsibility for equipment/system. During system shakedown, several tests and evaluations are performed to verify the adequacy and acceptability of procedures. These tests and evaluations shall be accomplished prior to the OT&E. Shakedown tests check to verify that the system functions properly, meets operational requirements, and is maintainable. The system shakedown permits facility personnel to become familiar with the system, learn its limitations, and to become proficient in diagnosing problems and effecting repairs. The system shakedown ends when JAI activities begin. The system shakedown include accomplishing the following activities.

a. Proficiency. Operational and maintenance proficiency and hands-on training are evaluated.

b. Adequacy. Evaluations to determine the adequacy of system failure detection and recovery procedures are conducted.

c. Operational Functions. Live testing of operational functions, including specific adaptation data, and system configuration is accomplished prior to system acceptance.

d. Suitability. Evaluations are conducted to determine the suitability of the displayed operational data, and establish any additional data requirements that may exist.

86. JOINT ACCEPTANCE INSPECTION. JAI is conducted in accordance with Order 6030.45, Facility Reference Data File, to gain the concurrence of involved offices that the VHF DF system project has been completed in accordance with applicable standards and specifications and that the facilities are capable of providing the services required within established standards and tolerances. The JAI ensures compliance with requirements in the following areas:

a. Facility Construction and Equipment Installation.

b. Facility/System/Equipment Performance.

c. Facility Technical Performance Documentation and Maintenance Reference Data.

d. Facility Logistics Support.

e. Final Acceptance and Commissioning.

87.-89. RESERVED.

CHAPTER 9. INTEGRATED LOGISTICS SUPPORT

90. MAINTENANCE CONCEPT. The concept of maintenance for the VHF DF system shall consist of both site and depot repair.

a. RMMS Capability. The RMMS will provide the capability to automate and remotely control the periodic equipment performance monitoring tasks and the recording of site data, support fault isolation, diagnostic testing, and control of the remote sites.

b. Site Maintenance. Maintenance technicians will replace VHF DF system components down to the LRU and may perform limited repair/corrective and preventative maintenance functions as required, onsite.

c. FAA Logistics Center Maintenance. FAA Logistics Center (Depot) maintenance consists of receipt and repair/replacement of failed LRU's. Initially, depot level repairs services will be supplied by the manufacturer under Contractor Repair Service (CRS) contract modification. For repair and testing of LRU's, a "hot" test-bed will be provided to the FAA Logistics Center.

d. Maintenance Plan. The NAILS Plan for this project was updated as Revision 1, dated July 30, 1992, in accordance with Order 1800.58, National Airspace Integrated Logistics Support Policy. The Maintenance Plan for the VHF DF system is included as Appendix D to the ILSP.

91. TRAINING. The training program for the VHF DF system is contained in the VHF DF Subsystem Training Plan. Assignment of training quotas for the regions will be made by ASM-260 for Airway Facilities personnel. Training assignments for Air Traffic flight service specialists is made by ATZ-100 in coordination with ATR-100 and AHT-500. Projected training requirements by individual work centers or facilities and principal training milestones are included in the training plan.

a. Airway Facilities. The initial training for Airway Facilities personnel will be conducted by the contractor (10 classes of 12 students) at the FAA Academy. The contractor classes will train FAA Academy instructor personnel, who will generate academy resident training courses, and those engineers and technicians who will perform the initial shakedown testing for the first ORD facility. Training courses were developed and will be conducted at the FAA Academy for those technicians who will perform maintenance on the VHF DF Systems and additional FAA Academy personnel who will be teaching resident training courses.

Training course graduates will be able to configure the system for normal operation and system testing using the manufacturers Technical Instructions and FAA Maintenance Handbook. They will possess sufficient knowledge to troubleshoot and repair to LRU level and to perform and document all periodic maintenance.

b. Flight Service Specialists. Training courses for flight service specialists will be developed by the FAA Academy. A cadre of AFSS specialists, two from each AFSS, will be trained at the FAA Academy to support OJT training of AFSS specialists requiring system operational certification at their home station. The OJT of specialists in the operation the new VHF DF will be conducted in their own facility environments.

92. SUPPORT TOOLS AND TEST EQUIPMENT. This section describes support and test equipment, including all common and special tools, as well as other interface devices necessary to support equipment to the end item or Unit Under Test. Test equipment is supported at the Airway Facilities sector office having responsibility for the AFSS VHF DF facility.

a. Common Tools and Test Equipment. The contractor provides a list of the common tools, test support equipment, interface devices and connectors required for maintaining VHF DF equipment at all levels of maintenance. This list is subject to review and approval by the program office, and ASM-100. The following list of test equipment required for maintenance procedures is generally available in Airway Facilities Sectors but may not be available down to unit level:

(1) Digital Multimeter, (.1 percent accuracy).

(2) Oscilloscope, (10 mHz bandwidth).

(3) Frequency Counter, 200 mHz frequency range, 100 Hz resolution, -20 dBm sensitivity.

(4) IOT3 MDT, (MDT Furnished with VHF DF equipment).

(5) Spectrum Analyzer, 10 mHz minimum frequency range, 70 Db dynamic range, 10 kHz minimum resolution bandwidth.

(6) Signal Generator, 200 mHz minimum frequency range, 1 kHz accuracy, 70 dB minimum spurious and phase noise, (+1 to -1 dB output accuracy) with external modulation input.

(7) Audio Analyzer with Audio Source and Filters, 50 Hz to 100 kHz frequency range, 50 mv minimum input sensitivity, 80 dB (.1 percent) noise and distortion measurement capability.

(8) System Multimeter, 200 kHz frequency range, 600 ohms and 8 ohms select able input impedance, 0 to -20 dBm range.

(9) Test Cables (four Types):
(a) RF, N to N (3).
(c) RF, N to SMA (2).
(b) RS232 (1).
(d) Audio, dual banana to audio plug (1).

b. Specials Tools and Test Equipment. Special tools and test equipment required for initial adjustments, testing, and/or maintenance of the VHF DF will be provided with the equipment. Special support equipment includes:

(1) Installation Support.

(a) Comb Generator, required for antenna error spread optimization during initial installation and provided by the program office.

(b) Quickwriter EPROM Writer/Reader Card.

(2) Software Maintenance Support, Antenna and Receiver Components, AOS-200.

(a) Development Machine, 386 Computer with 4 Meg random access memory (RAM), VGA Monitor, 80 Meg Hard Drive, and Printer.

(b) Program Editor, Intel AEDIT or Brief.

(c) MS-DOS.

(d) Polytron Version Control Software.

(e) Polytron Make Utility.

(f) PL/M-51 Cross Compiler, ACP Specific

(g) ASM-51 Cross Assembler, ACP Specific

(h) PL/M Cross Compiler, MCP/FCPU Specific

(i) ASM-86 Cross Assembler, MCP/FCPU Specific

(j) IRMX-1 for DOS Environment.

(3) Filter Software Support, AOS-200.

(a) Apple IIE, or equivalent Computer, Monochrome Monitor with California Computer System Model 7710 Serial Card.

(b) Quickwriter EPROM Writer/Reader Card.

(c) C-Software Corporation Micro Assembler, Version 2.0.

(4) AFSS VHF DF Equipment Software Support, AOS-200.

(a) Hard Disk, 140 Meg, for the Intel 310 System.

(b) iRMX-III for IRMX.

(c) Compiler C386 or PLM86.

(d) ASM386.

(e) iRMX-I for IRMX.

(f) PL/M-86.

(g) ASM-86.

(h) AEDIT Editor.

93. SUPPLY SUPPORT. The FAA Logistics Center is responsible for providing supply support to the VHF DF System in the area of procurement, storage, and transportation of spare parts-peculiar, component parts - both common and LRU's. This responsibility also encompasses maintaining inventory records including the FAA Supply Catalog, and interfacing with the Federal Cataloging System. The FAA Logistics Center is also responsible for the repair of LRU's either in house or by contractor repair services. This does not include supply support nor personal computer (PC) equipment or components (e.g., PC in the IDCU, IOT-2) repairs. PC equipment will be supported as directed by the Systems Maintenance Service, in connection with the program office.

94. TECHNICAL INSTRUCTION BOOKS AND OTHER VENDOR DATA. Technical Instruction Books for the VHF DF system will be developed by the contractor and reviewed by the FAA prior to acceptance. Two sets of instruction books will be provided with each VHF DF system delivered. Other vendor data to be provided by the contractor includes: maintainability and reliability test plan, procedures, and reports; VHF DF system test plans, procedures, and reports; software documentation; commercial manuals; and production design and interface control drawings.

95. EQUIPMENT REMOVAL. The present FA-5530 VHF DF equipment at locations being replaced within this program will be returned to the FAA Logistics Center for cannibalization. The spare parts will be used in supporting the remaining FA-5530 systems not replaced by this acquisition. Contact FAA Logistics Center, NAS Section, AML-622, FTS (405) 954-4421, for the latest directions on the disposal action.

96. FACILITIES. Not applicable.

97. EQUIPMENT NOT FURNISHED. Not applicable.

98. PERSONNEL CERTIFICATION. Airway Facilities personnel assigned to maintaining the new VHF DF equipment shall require certification in accordance with Order 3400.3E, Airway Facilities Maintenance Certification Program. Air Traffic FSS specialists requiring operational ratings or certification will comply with Order 3120.4, Air Traffic Training, and Order 7220.1A, Handbook for Certification and Rating Procedures.

99. EQUIPMENT CERTIFICATION. Equipment certification for the VHF DF system shall be in accordance with Order 6530.10, Maintenance of FA-10121 VHF Direction Finder Systems, and Order 6000.15A, General Maintenance Handbook for Airway Facilities.

CHAPTER 10. ADDITIONAL PROJECT IMPLEMENTATION ASPECTS

100.-109. RESERVED.

APPENDIX 1. VHF DF DELIVERY SCHEDULE

THE ALASKAN REGION (AAL)

DF Site's for KENAI, AK. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
AK	Kenai AFSS	FA-10123	Install First		9/93
AK	Bethel	FA-10121/10122	Replace/R	8	7/94
AK	Dillingham	FA-10121/10122	Replace/R	5	5/94
AK	Gulkana	FA-10121/10122	Replace	7	6/94
AK	Homer	FA-10121/10122	Replace	1	9/93
AK	King Salmon	FA-10121/10122	Replace/R	6	5/94
AK	Kenai	FA-10XXX/5530	Replace	9	Future

DF Site's for the FAIRBANKS, AK. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
AK	Fairbanks AFSS	FA-10123	Install First		10/93
AK	Kotzebue	FA-10121/10122	Replace/R	2	10/93

DF Site's for the JUNEAU, AK. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
AK	Juneau AFSS	FA-10123	Install First		11/93
AK	Cordova	FA-10121/10122	Replace/R	4	4/94
AK	Yakatat	FA-10121/10122	Replace	3	11/93

THE CENTRAL REGION (ACE)

DF Site's for the COLUMBIA, MO. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
MO	Columbia AFSS	FA-10123	Install First		10/93
MO	Chillicothe	FA-10121/10122	Replace	2	10/93
MO	Columbia	FA-10121/10122	Replace	11	9/94
MO	West Plains	FA-10XXX/5530	Replace	13	Future

DF Site's for the FORT DODGE, IA. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
IA	Fort Dodge AFSS	FA-10123	Install First		1/94
IA	Mason City	FA-10121/10122	Replace	5	1/94

DF Site's for the WICHITA, KS. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
KS	Wichita AFSS	FA-10123	Install First		9/93
KS	Goodland	FA-10121/10122	Replace	7	5/94
KS	Liberal	FA-10121/10122	Replace	6	4/94
KS	Salina	FA-10121/10122	Replace	1	9/93
KS	Chanute	FA-10XXX/5530	Replace	8	Future
KS	Russell	FA-10XXX/5530	Replace	12	Future

DF Site's for the COLUMBUS, NE. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
NE	Columbus AFSS	FA-10123	Install First		12/93
NE	Hastings	FA-10121/10122	Replace	10	8/94
NE	North Platte	FA-10121/10122	Replace	9	6/94
NE	Scottsbluff	FA-10121/10122	Replace	4	12/93

DF Site's for the ST. LOUIS, MO. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
MO	St. Louis AFSS	FA-10123	Install First		11/93
MO	Cape Girardeau	FA-10121/10122	Replace	3	11/93
IL	Decatur	FA-10121/10122	Replace	10 GL	7/94
IL	Quincy	FA-10XXX/5530	Replace	GL	Future

THE EASTERN REGION (AEA)

DF Site's for the ALTOONA, PA. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
PA	Altoona AFSS	FA-10123	Install First		9/93
PA	Bradford	FA-10121/10122	Replace	1	9/93
PA	Du Bois	FA-10121/10122	Replace	8	4/94

DF Site's for the BUFFALO, N.Y. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
NY	Buffalo AFSS	FA-10123	Install First		10/93
NY	Elmira	FA-10121/10122	Replace	2	10/93
PA	Erie	FA-10121/10122	Replace	9	5/94
NY	Delancy	FA-10XXX/5530	Replace		Future

DF Site's for the ELKINS, W.V. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
WV	Elkins AFSS	FA-10123	Install First		12/93
WV	Bluefield	FA-10121/10122	Replace	4	12/93
WV	Morgantown	FA-10121/10122	Replace	10	6/94
WV	Martinburg	FA-10121/10122	Replace	11	7/94

DF Site's for the WILLIAMSPORT, PA. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
PA	Williamsport AFSS	FA-10123	Install First		2/94
PA	Williamsport	FA-10121/10122	Replace	6	2/94

DF Site's for the ISLIP, N.Y. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
NY	Islip AFSS	FA-10123	Install First		1/94
NY	Islip	FA-10121/10122	Replace	12	8/94
NY	Poughkeepsie	FA-10121/10122	Replace	5	1/94

DF Site's for the MILLVILLE, N.J. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
NJ	Millville AFSS	FA-10123	Install Enhancements		3/94
NJ	Millville	FA-10121/10122	Installed	7	4/89

DF Site's for the LEESBURG, VA. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
VA	Leesburg AFSS	FA-10123	Install First		11/93
VA	Lynchburg	FA-10121/10122	Replace	14	9/94
MD	Salisbury	FA-10121/10122	Replace	3	11/93

THE GREAT LAKES REGION (AGL)

DF Site's for the CLEVELAND, OH. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
OH	Cleveland AFSS	FA-10123	Install First		2/94
OH	Findlay	FA-10121/10122	Replace	6	2/94
OH	Mansfield	FA-10121/10122	Replace	14	7/94

DF Site's for the GRAND FORK, N.D. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
ND	Grand Fork AFSS	FA-10123	Install First		9/93
ND	Dickinson	FA-10121/10122	Replace	19	10/94
ND	Grand Forks	FA-10121/10122	Replace	1	9/93
ND	Jamestown	FA-10XXX/5530	Replace	21	Future
ND	Minot	FA-10XXX/5530	Replace	22	Future

DF Site's for the GREEN BAY, WI. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
WI	Green Bay AFSS	FA-10123	Install Enhacements		7/93
WI	Green Bay	FA-10121/10122	Installed	9	2/90
WI	Eau Claire	FA-10121/10122	Installed	11	11/92
MI	Marquette	FA-10121/10122	Installed	18	11/92

DF Site's for the HURON, S.D. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
SD	Huron AFSS	FA-10123	Install First		10/93
SD	Huron	FA-10121/10122	Replace	2	10/93
SD	Rapid City	FA-10121/10122	Replace	17	9/94
SD	Pierre	FA-10XXX/5530	Replace		Future

DF Site's for the TERRE HAUTE, IN. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
IN	Terre Haute AFSS	FA-10123	Install First		3/94
IN	Fort Wayne	FA-10121/10122	Replace	8	3/94
IN	South Bend	FA-10121/10122	Replace	13	6/94

DF Site's for the KANKAKEE, IL. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
IL	Kankakee AFSS	FA-10123	Install First		4/94
IL	Bradford	FA-10121/10122	Establish	5	4/94

DF Site's for the LANSING, MI. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
MI	Lansing AFSS	FA-10123	Install First		12/93
MI	Litchfield	FA-10121/10122	Establish	4	12/93
MI	Saginaw	FA-10121/10122	Replace	12	5/94
MI	Traverse City	FA-10XXX/5530	Replace	20	Future

DF Site's for the PRINCETON, MN. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
MN	Princeton AFSS	FA-10123	Install First		11/93
MN	Alexandria	FA-10121/10122	Replace	16	9/94
MN	Hibbing	FA-10121/10122	Replace	15	8/94
MN	Princeton	FA-10121/10122	Replace	3	11/93

DF Site's for the DAYTON, OH. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
OH	Dayton AFSS	FA-10123	Install First		2/94
OH	Athens	FA-10121/10122	Establish	7	2/94

THE NEW ENGLAND REGION (ANE)

DF Site's for the BRIDGEPORT, CT. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
CT	Bridgeport AFSS	FA-10123	Install First		10/93
MA	Nantucket	FA-10121/10122	Replace	6	6/94
MA	Worcester	FA-10121/10122	Replace	2	10/93

DF Site's for the BANGOR, ME. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
ME	Bangor AFSS	FA-10123	Install First		9/93
ME	Augusta	FA-10121/10122	Replace	5	5/94
NH	Concord	FA-10121/10122	Replace	4	4/94
ME	Houlton	FA-10121/10122	Replace	1	9/93

DF Site's for the BURLINGTON, VT. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
VT	Burlington AFSS	FA-10123	Install First		11/93
VT	Montpelier	FA-10121/10122	Replace	3	11/93
NY	Massena	FA-10XXX/5530	Replace	13 EA	Future

THE NORTHWEST MOUNTION REGION (ANM)

DF Site's for the BOISE, ID. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
ID	Boise AFSS	FA-10123	Install First		11/93
ID	Burley	FA-10121/10122	Replace	3	11/93
ID	Idaho Falls	FA-10121/10122	Replace	9	5/94

DF Site's for the CEDAR CITY, UT. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
UT	Cedar City AFSS	FA-10123	Install First		9/93
UT	Hanksville	FA-10121/10122	Replace	1	9/93

DF Site's for the CASPER, WY. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
WY	Casper AFSS	FA-10123	Install First		3/94
WY	Cheyenne	FA-10121/10122	Replace	7	3/94

DF Site's for the DENVER, CO. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
CO	Denver AFSS	FA-10123	Install First		1/94
CO	Grand Junction	FA-10121/10122	Replace	8	4/94
CO	Trinidad	FA-10121/10122	Replace	5	1/94

DF Site's for the GREAT FALLS, MT. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
MT	Great Falls AFSS	FA-10123	Install First		10/93
MT	Cut Bank	FA-10121/10122	Replace	2	10/93
MT	Lewistown	FA-10121/10122	Replace	10	6/94

DF Site's for the McMINNVILLE, OR. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
OR	McMinnville AFSS	FA-10123	Install First		2/94
OR	North Bend	FA-10121/10122	Replace	6	2/94

DF Site's for the SEATTLE, WA. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
WA	Seattle AFSS	FA-10123	Install First		12/93
WA	Badger Mtn	FA-10121/10122	Replace	4	12/93

THE SOUTHERN REGION (ASO)

DF Site's for the ANNISTON, AL. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
AL	Anniston AFSS	FA-10123	Install First		3/94
AL	Muscle Shoals	FA-10121/10122	Replace	7	3/94

DF Site's for the ANDERSON, S.C. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
SC	Anderson AFSS	FA-10123	Install First		3/94
SC	Charleston	FA-10121/10122	Replace	8	3/94

DF Site's for the NASHVILLE, TN. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
TN	Nashville AFSS	FA-10123	Install First		10/93
TN	Knoxville	FA-10121/10122	Replace	2	10/93
TN	Shelbyville	FA-9964	Relocated/Replaced FA-5530		

DF Site's for the GAINSVILLE, FL. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
FL	Gainsville AFSS	FA-10123	Install First		3/94
FL	Craig Field	FA-10121/10122	Replace	18	10/94
FL	Gainsville	FA-10121/10122	Replace	9	3/94
FL	Tallahassee	FA-10121/10122	Replace	17	10/94
FL	Crestview	FA-10XXX/5530	Replace	19	Future

DF Site's for the GREENWOOD, MS. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
MS	Greenwood AFSS	FA-10123	Install First		6/94
MS	McComb	FA-10121/10122	Establish	12	6/94
MS	Quitman	FA-10121/10122	Establish	13	7/94

DF Site's for the LOUISVILLE, KY. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
KY	Louisville AFSS	FA-10123	Install First		11/93
KY	London	FA-10121/10122	Replace	3	11/93

DF Site's for the MACON, GA. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
GA	Macon AFSS	FA-10123	Install First		9/93
GA	Albany	FA-10121/10122	Replace	1	9/93
GA	Augusta	FA-10121/10122	Replace	15	8/94

DF Site's for the MIAMI, FL. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
FL	Miami AFSS	FA-10123	Install First		1/94
FL	Key West	FA-10121/10122	Replace	5	1/94
FL	Tamiami	FA-10XXX/5530	Replace		Future

DF Site's for the JACKSON, TN. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
TN	Jackson AFSS	FA-10123	Install First		5/94
TN	Jacks Creek	FA-10121/10122	Establish	11	5/94

DF Site's for the ST. PETERSBURG, FL. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
FL	St.Petersburg AFSS	FA-10123	Install First		12/93
FL	Vero Beach	FA-10121/10122	Replace	4	12/93
FL	St Petersburg	FA-10XXX/5530	Replace		Future

DF Site's for the RALEIGH, N.C. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
NC	Raleigh AFSS	FA-10123	Install First		2/94
NC	Hickory	FA-10121/10122	Replace	6	2/94
NC	New Bern	FA-10121/10122	Replace	16	9/94

DF Site's for the SAN JUAN, P.R. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
PR	San Juan AFSS	FA-10123	Install First		4/94
PR	San Juan	FA-10121/10122	Establish	10	4/94

THE SOUTHWEST REGION (ASW)

DF Site's for the ALBUQUERQUE, N.M. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
NM	Albuquerque AFSS	FA-10123	Install First		3/94
NM	Farmington	FA-10121/10122	Replace	10	6/94
NM	Roswell	FA-10121/10122	Replace	20	10/94
NM	Zuni	FA-10121/10122	Replace	22	10/94
NM	Tucumcari	FA-10121/10122	Replace	7	3/94
NM	Truth or Cons.	FA-10XXX/5530	Replace	21	Future

DF Site's for the CONROE, TX. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
TX	Conroe AFSS	FA-10123	Install First		11/93
TX	Lufkin	FA-10121/10122	Replace	9	5/94
TX	Palacios	FA-10121/10122	Replace	3	11/93

DF Site's for the FORT WORTH, TX. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
TX	Fort Worth AFSS	FA-10121	Install First		9/93
TX	Childress	FA-10121/10122	Replace	1	9/93
TX	Dalhart	FA-10121/10122	Replace	11	7/94

DF Site's for the JONESBORO, AR. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
AR	Jonesboro AFSS	FA-10123	Install First		10/93
AR	EL Dorado	FA-10121/10122	Replace	14	10/94
AR	Fayetteville	FA-10121/10122	Replace	16	10/94
AR	Texarkana	FA-10121/10122	Replace	2	10/93
AR	Pine Bluff	FA-10XXX/5530	Replace	19	Future

DF Site's for the McALESTER, OK. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
OK	McAlester AFSS	FA-10123	Install First		12/93
OK	Gage	FA-10121/10122	Replace	12	8/94
OK	Ponca City	FA-10121/10122	Replace	4	12/93
OK	Ardmore	FA-10XXX/5530	Replace	18	Future
OK	McAlester	FA-10XXX/5530	Replace	17	Future
OK	Elk City	FA-10XXX	(NOTE) Weatherford, Tx.		Future

NOTE: Relocation Project by Regional Planning

DF Site's for the SAN ANGELO, TX. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
TX	San Angelo AFSS	FA-10123	Install First		1/94
TX	Freer	FA-10121/10122	Replace ALI	8	4/94
TX	McAllen	FA-10121/10122	Replace	15	10/94
TX	Wink	FA-10121/10122	Replace	5	1/94

DF Site's for the DERIDDER, LA. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
LA	Deridder AFSS	FA-10123	Install First		2/94
LA	Alexandria	FA-10121/10122	Replace	6	2/94
LA	Lafayette	FA-10121/10122	Replace	13	9/94

THE WESTERN-PACIFIC REGION (AWP)

DF Site's for the OAKLAND, CA. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
CA	Oakland AFSS	FA-10123	Install First		1/94
CA	Arcata	FA-10121/10122	Replace	5	1/94

DF Site's for the RANCHO MURIETO, CA. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
CA	Rancho Murieto AFSS	FA-10123	Install First		10/93
CA	Friant	FA-10121/10122	Replace	10	7/94
CA	Lebec	FA-10121/10122	Replace	2	10/93
CA	Red Bluff	FA-9964	Relocated/Replaced FA-5530		

DF Site's for the HAWTHORNE, CA. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
CA	Hawthorne AFSS	FA-10123	Install First		5/94
CA	Gaviota	FA-10121/10122	Replace/R FA-9964	8	5/94

DF Site's for the HONOLULU, HI. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
HI	Honolulu AFSS	FA-10123	Install First		12/93
HI	Lihue	FA-10121/10122	Replace	4	12/93
HI	Upolu Pt	FA-10121/10122	Replace	9	6/94

DF Site's for the PRESCOTT, AZ. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
AZ	Prescott AFSS	FA-10123	Install First		11/93
AZ	MT Lemmon	FA-10121/10122	Replace	3	11/93

DF Site's for the RIVERSIDE, CA. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
CA	Riverside AFSS	FA-10123	Install First		2/94
CA	Blythe	FA-10121/10122	Replace	6	2/94

DF Site's for the RENO, NV. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
NV	Reno AFSS	FA-10123	Install First		9/93
NV	Elko	FA-10121/10122	Replace	11	8/94
NV	Tonopah	FA-10121/10122	Replace	1	9/93

DF Site's for the SAN DIEGO, CA. AFSS

State	Location	Equipment Type	Effort	Priority	Delivery
CA	San Diego AFSS	FA-10123	Install First		4/94
AZ	Yuma	FA-10121/10122	Replace/R FA-9964	7	4/94

MIKE MONRONEY AERONAUTICAL CENTER (AMC)

1. FAA ACADEMY (AMA) AIR TRAFFIC AND AIRWAY FACILITIES TRAINING. Air Traffic Training Facility, AMA-570: FA-10123 AFSS RMMC equipment, two IDCU, Input-Output Unit-2 (IOT-2), Printer and set of spares - Installed, March 1992. This system is to be replaced with VHF DF Simulator/Trainer units, date planned August 1993. Airway Facilities Training Facility, AMA-430: Complete FA-10121 System including Antenna Receiver site equipment, AFSS equipment RMMC/IDCU/IOT-2/Printer and one set of spares plus an additional RMMC subsystem with an antenna simulator - Installed, March 1992.

2. FAA LOGISTICS CENTER (AML). The Engineering and Production Division, AML-400, will receive a complete FA-10121 System (Depot Level Maintenance Test Bed) to be delivered at completion of contractor repair service.

3. NATIONAL ENGINEERING FIELD SUPPORT DIVISION, AOS-200. Complete FA-10121 System - System Maintenance Engineering Test Facility RMMC and Antenna site equipment with Target Antennas were delivered to AOS-240. The remaining equipment delivery to be determined.

NOTES: DELIVERY OF RF PRE-AMPLIFIER/FILTER SUBSYSTEMS WILL BE DETERMINED ON AN "AS REQUESTED" BASIS.

FA-10XXX - INDICATES FUTURE PROCUREMENT EQUIPMENT, TYPE NUMBER NOT ASSIGNED.

"INSTALL FIRST" - INITIAL INSTALLATION EFFORT IN EACH AFSS DF NETWORK.

"REPLACE" - REPLACE EXISTING EQUIPMENT AT THE SAME FACILITY LOCATION OR "REPLACE/R" - REPLACE EQUIPMENT AND RELOCATE TO A NEW SITE.

APPENDIX 2. VHF DF SIMULATOR TRAINER DELIVERY SCHEDULE

Region	State	Site Name	Ident.	Delivery
--	OK	FAA Academy, Training Facilities	AMA-430/570	08/93
GL	WI	Green Bay AFSS	GRB	08/93
AK	AK	Kenai AFSS	ENA	09/93
CE	KS	Wichita AFSS	ICT	09/93
EA	PA	Altoona AFSS	AOO	09/93
GL	ND	Grand Forks AFSS	GFK	09/93
NE	ME	Bangor AFSS	BGR	09/93
NM	UT	Cedar City AFSS	CDC	10/93
SO	GA	Macon AFSS	MCN	10/93
SW	TX	Fort Worth AFSS	FTW	10/93
WP	NV	Reno AFSS	RNO	10/93
AK	AK	Fairbanks AFSS	FAI	10/93
CE	MO	Columbia AFSS	COU	10/93
EA	NY	Buffalo AFSS	BUF	10/93
GL	SD	Huron AFSS	HON	10/93
NE	VT	Burlington AFSS	BTV	11/93
NM	MT	Great Falls AFSS	GTF	11/93
SO	TN	Nashville AFSS	BNA	11/93
SW	AR	Jonesboro AFSS	JBR	11/93
WP	CA	Rancho Murieto AFSS	RIU	11/93
AK	AK	Juneau AFSS	JNU	11/93

Region	State	Site Name	Ident.	Delivery
CE	MO	St. Louis AFSS	STL	11/93
EA	VA	Leesburg AFSS	WO9	11/93
GL	MN	Princeton AFSS	PNM	12/93
NE	CT	Bridgeport AFSS	BDR	12/93
NM	ID	Boise AFSS	BOI	12/93
SO	KY	Louisville AFSS	LOU	12/93
SW	TX	Conroe AFSS	CXC	12/93
WP	AZ	Prescott AFSS	PRC	12/93
CE	NE	Columbus AFSS	OLU	12/93
EA	WV	Elkins AFSS	EKN	12/93
GL	MI	Lansing AFSS	LAN	02/94
NM	WA	Seattle AFSS	SEA	02/94
SO	FL	St.Petersburg AFSS	PIE	02/94
SW	OK	McAlester AFSS	MLC	02/94
WP	HI	Honolulu AFSS	HNL	02/94
CE	IA	Fort Dodge AFSS	FOD	02/94
EA	NY	Islip AFSS	ISP	02/94
EA	NJ	Millville AFSS	MIV	02/94
NM	CO	Denver AFSS	DEN	03/94
SO	FL	Miami AFSS	MIA	03/94
SW	TX	San Angelo AFSS	SJT	03/94
WP	CA	Oakland AFSS	OAK	03/94

Region	State	Site Name	Ident.	Delivery
EA	PA	Williamsport AFSS	IPT	03/94
GL	OH	Cleveland AFSS	CLE	03/94
NM	OR	McMinnville AFSS	MMV	03/94
SO	NC	Raleigh AFSS	RDU	03/94
SW	LA	Deridder AFSS	DRI	04/94
WP	CA	Riverside AFSS	RAL	04/94
GL	OH	Dayton AFSS	DAY	04/94
NM	WY	Casper AFSS	CPR	04/94
SO	AL	Anniston AFSS	ANB	04/94
SW	NM	Albuquerque AFSS	ABQ	04/94
GL	IN	Terre Haute AFSS	HUF	04/94
SO	SC	Anderson AFSS	AND	04/94
SO	FL	Gainsville AFSS	GNV	05/94
GL	IL	Kankakee AFSS	IKK	05/94
SO	PR	San Juan AFSS	SJU	05/94
WP	CA	San Diego AFSS	SAN	05/94
SO	TN	Jackson AFSS	MKL	05/94
WP	CA	Hawthorne AFSS	HHR	05/94
SO	MS	Greenwood AFSS	GWO	05/94
--	OK	National Support Test Site	AOS	05/94

*U.S. G.P.O.:1993-343-273:80259